THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—47TH YEAR SYDNEY, SATURDAY, JUNE 25, 1960 No. 26

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES— Page

John Woodall, an Elizabethan Surgeon, by J. Estcourt Hughes .. 1001
Superficial Mycoses in Melbourne, by Mary Morton 1006
Some Aspects of Drug Resistance in Tuberculosis and Its Treatment, by S. Gillis .. 1014
Preanæsthetic Sedation for Children, by Geoffrey Cornish and Douglas Galbraith .. 1020
Anti-Rh$_o$(D) Antibodies Produced by Iso-Immunization in an Rh-Positive Mother of the Unusual Genotype R^{1}r^{y} (CD^{u}e/CdE), by R. T. Simmons and Vera I. Krieger .. 1021

REPORTS OF CASES—

Hypopituitarism a Cause of Refractory Anæmia, by W. Hamilton Smith .. 1022
Post-Partum Broad Ligament Hæmatoma, by Jean Murray-Jones .. 1025
Miliary Tuberculosis at the Extremes of Life, by Leslie Williams .. 1026

REVIEWS—

The Premature Baby .. 1027
Surgery in Infancy and Childhood .. 1027
Whillis's Elementary Anatomy and Physiology .. 1027
Surgery of the Colon .. 1028
Cryptorchism .. 1028

BOOKS RECEIVED .. 1028

LEADING ARTICLES—

Medical Research in Australia .. 1029

CURRENT COMMENT—

Monkey into Space .. 1030
Thirteenth World Health Assembly .. 1031
Marriage and Divorce .. 1031

ABSTRACTS FROM MEDICAL LITERATURE—

Pædiatrics .. 1032
Psychiatry .. 1032
Neurology .. 1033

RESEARCH—

Research Projects in Medicine and Allied Sciences in Australia .. 1034

CLINICO-PATHOLOGICAL CONFERENCES— Page

A Conference at Sydney Hospital .. 1040

OUT OF THE PAST .. 1043

CORRESPONDENCE—

The Medical Treatment of Minors .. 1043
General Pharmaceutical Benefits .. 1043
Surgery and the General Practitioner and Professional Unity .. *1044*
Smallpox Vaccination .. 1045
It Happened One Night .. 1045

OBITUARY—

James Joscelyn Lawrence .. 1045
Gordon Harold Pfeiffer .. 1045

THE ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS—

Admissions to Fellowship and Membership .. 1046
Examination for Membership .. 1046

POST-GRADUATE WORK—

The Post-Graduate Committee in Medicine in the University of Sydney .. 1046
St. Vincent's Hospital, Sydney .. 1046

NOTES AND NEWS .. 1046

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA .. 1047

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS—

Victorian State Committee: Post-Graduate Course in Surgery .. 1047

HONOURS—

Birthday Honours .. 1048

THE WORLD MEDICAL ASSOCIATION .. 1048

UNIVERSITY INTELLIGENCE .. 1048

NOMINATIONS AND ELECTIONS .. 1048

DEATHS .. 1048

DIARY FOR THE MONTH .. 1048

MEDICAL APPOINTMENTS: IMPORTANT NOTICE .. 1048

EDITORIAL NOTICES .. 1048

JOHN WOODALL, AN ELIZABETHAN SURGEON.[1]

By J. ESTCOURT HUGHES, M.S., F.R.A.C.S.,
Adelaide.

TODAY I have the honour of presenting to you the fifth Herbert Moran Memorial Lecture, and I am most grateful to the Council of the Royal Australasian College of Surgeons for the invitation to do so.

I have chosen as my subject the life and work of John Woodall, who lived in times that were both stirring and important, and we must spend a little time in considering the national and professional background against which he worked before passing on to a more detailed account of Woodall himself.

The year of Woodall's birth is somewhat uncertain, but is generally given as 1556 or thereabouts, while he is known to have died in 1643. This means that he was born two years before the accession of Queen Elizabeth I, and died a year after the outbreak of the conflict between Charles I and his Parliament, which is known, according to your sympathies, as the Great Rebellion or the Civil War. He may be regarded, therefore, as the bridge by which the great traditions of Elizabethan surgery were directly transmitted to the early Stuart period, and indirectly to the Cromwellian Commonwealth and the Restoration because of his writings. The first Elizabethan age, into which Woodall was born, was one of the most memorable and important in the whole range of English history.

Under the Tudors, England had been steadily emerging as a national State after the chaos and near-anarchy of the Wars of the Roses, and with Elizabeth's accession she entered upon a new, fortunate and glorious chapter in her history. The Elizabethans placed supreme value on the active life, and from amongst them arose many great men of action who engaged in a variety of adventures and enterprises on land and sea which made England respected and feared; but, in addition to these, the age also produced Shakespeare, Spenser, Marlowe and many others, who between them put the literature of their time

[1] The fifth H. M. Moran Memorial Lecture, delivered at a meeting arranged by the New South Wales State Committee of the Royal Australasian College of Surgeons on March 14, 1959, at Canberra. The lecture was introduced with a sympathetic appreciation of the late H. M. Moran, but this has been omitted because of limitations of space.

on a pinnacle from which it has never been displaced. In the realm of philosophy and thought, Francis Bacon was also of this age, one of its leading luminaries, and an almost unique combination of scientist, philosopher, lawyer and writer.

In the field of education, advances kept pace with the other activities of the nation. Five of England's greatest public schools were founded and the grammar-school system was extended to every town, while at the old universities of Oxford and Cambridge new buildings and new foundations were created.

The upsurge of the new nationalism and spirit of adventure led to growth and expansion, with a determination to yield to no foreign tutelage or dominion and to throw off all vestiges of any past subjection. Although only one of the many factors involved, the new nationalism was a potent one in the religious changes of the time.

The oceanic enterprises of the reign led to the formation of many trading concerns, such as the Turkey Company, the Levant Company and, most important of all, the East India Company. Virginia was settled, and the great voyages of Hawkins and Drake extended English influence and aroused national enthusiasm.

The war with Spain, which dragged its weary length over the last two decades of Elizabeth's reign and carried over into the early years of James I, is commonly regarded as primarily a religious struggle; but it really originated in a determination to secure for England a share in the territory of America and the trade that would follow such an acquisition. The outstanding event of this war was the despatch of the Armada in 1588, and its defeat by the smaller but better-built English ships, which were better handled by very much better seamen. The deliverance of England from the threat constituted by the Armada was accomplished by a narrower margin than is usually realized, because medically it was a near-disaster. An epidemic of food poisoning broke out in the English ships and had seriously reduced the number and efficiency of the seamen manning them. Medical care was grievously lacking, and victualling had proved such a problem that only two days' supplies were available in the ships when the contending fleets came to action. The temptation to go into this action and its medical associations in some detail is one that must be resisted, because Woodall, as far as is known, had no part in the fight with the Armada.

After the heroic age of Elizabeth, the early Stuart period was, especially from the naval point of view, very much of an anticlimax. This has by many been attributed to the ineptitude of the Stuarts; but in fact the drain on English man-power by all the activities of the previous reign was very largely responsible. The wastage from disease in Elizabeth's ships far exceeded that from wounds, and as a result the ships, even in periods of comparative idleness, had to be manned and re-manned, and at the end of the reign the bottom of the barrel had nearly been reached.

Charles I was a man of exemplary private character, capable of arousing great devotion, but he was an irresolute and often misguided ruler. One thing he did, however, was to set his heart on having a fleet, and he made many efforts to secure one. In so far as the imposition of the ship-money tax was one of the principal causes of the Great Rebellion, it might be said that his desire for a navy led ultimately to his downfall and death. The naval medical improvements of Charles' reign will be discussed later

Other contemporary events which show how active an age was that in which Woodall lived were the invention of the telescope by Galileo in 1609, the introduction of logarithms by Napier in 1614, the work of Kepler on the laws of planetary motion in 1618, the foundation by Descartes of analytical geometry in 1637, and the invention by Toricelli of the barometer in the year of Woodall's death.

After this necessarily brief and superficial survey of national, scientific and cultural events occurring in Woodall's lifetime, we must turn for a while to consider the professional background against which he did his work.

We find a profession sharply divided into the physicians, who comprised the *élite*, and the barber-surgeons, whose activities were completely dominated by the physicians—so much so that in 1572 the latter secured a court declaration, which stated that "it is illegal and unreasonable for a surgeon to give inward remedies even in the treatment of sciatica, the great pox, ulcers and wounds". Later they also obtained the right to oversee all but the most minor surgical procedures.

The physicians, however, showed great reluctance to serve in the armed forces of the day. The medical needs of these were met by the barber-surgeons, who found the restriction on the use of inward remedies inconsistent with everyday practice in the services. So complete was the division of the profession, and so bitter were the differences between the two elements, that it was only in their grip on the services that the surgeons found their safeguard against being blotted out by the physicians. Again, it was by their services to the army and the navy that the surgeons in these forces had the blessing of the State in practising both medicine and surgery.

The aims of Elizabethan surgeons appear to have been, in the main, threefold. Firstly, they set out to educate their apprentices in the elements of practical anatomy and surgery; secondly, they strove to reunite the mutually exclusive elements of medicine and surgery into one profession; thirdly, they aimed at the suppression of quackery in an age when it was rampant.

Medical training was by a system of apprenticeship supplemented by lectures and demonstrations by senior members of the Barber-Surgeons Company.

The text-books of a surgeon in training in Woodall's day would have been those of John Read, Thomas Gale (1507-1586) and William Clowes (1544-1604), while the anatomical work of Thomas Vicary (1495-1561) was still being used. Gale was an army surgeon, while Clowes served in both the army and the navy, but seemed predominantly interested in the latter service and played a prominent part in the action against the Armada, having been surgeon in *Ark Royal*, Lord Howard of Effingham's flagship.

The impression one gets of Clowes, who probably influenced Woodall a great deal, is of a vigorous, practical, outspoken man who, as a surgeon, was well read and discriminating, with a real gift for teaching. In his books he advocated the use of well-tried methods with means which were readily available.

Biographical Details of John Woodall.

After all this preamble, we come at last to John Woodall. I have already mentioned that 1556 is commonly accepted as the year of his birth, and I do not think we need spend time considering the alternative dates advanced by various authorities. He was the son of Richard Woodall, of Warwick, and of Mary, the daughter of Pierse Ithell, of North Wales. Little is known of his early life and education, and definite facts about his career are lacking until he is recorded as serving in Lord Willoughby's regiment, which went to France in 1591 as part of a force dispatched to assist the French King, Henry IV.

After this he spent a period of eight years abroad, mainly as surgeon to a colony of English merchants at Strodda near Posen on the Polish frontier. At some time during this period he acted as German interpreter to an embassy sent out by Queen Elizabeth. Returning to England in 1599, he was admitted to the Barber-Surgeons Company, but almost at once left for Holland. His activities there do not redound very much to his credit, as they seem to have centred largely around the preparation of that alleged panacea, mithridaticum, history's outstanding example of polypharmacy. One writer, in Churchillian vein, has said that "never has a medicine containing so much cured so little". It is alleged that the mithridaticum prepared by Woodall and his Dutch

associate was bogus, in that it contained only 9 instead of 75 ingredients.

In 1603, the year of Queen Elizabeth's death and James I's accession, Woodall returned to London, and he remained there during the outbreak of plague which occurred in that year.

In 1604 he was sent with a mission to the Czar of Russia, the special ambassador who headed the mission being Sir Thomas Smythe, the first master of the East India Company, and it seems certain that this association resulted in Woodall's appointment in 1612 as the first surgeon-general of the company.

How long this absence from England lasted is not clear; but Woodall was back in England by 1607, and it seems certain that thereafter he did not leave the country. This is of special interest because of the influence he attained subsequently in the East India company and the navy. It is probable that he never did a voyage in either an East Indiaman or a naval vessel.

It is a pity that we know so little of Woodall's surgical training, because the next important appointment which fell to his lot was that of surgeon to St. Bartholomew's Hospital in 1616; surely, even in the early seventeenth century, this must have meant that he was recognized as having adequate knowledge and experience and a suitable background. In this appointment he had as a physician colleague the great William Harvey.

His progress in the Barber-Surgeons Company was steady, and he became Warden and an examiner in 1626 and Master in 1633.

Woodall married Sara Henchpole, and had three sons and one daughter who survived him.

Woodall and the East India Company.

So extensive were Woodall's activities during his long life that it is only by dealing with his main interests one at a time that we may picture what he actually accomplished.

His first important appointment was that of Surgeon-General to the East India Company in 1612, an office which he held for nearly thirty years.

For many years before Queen Elizabeth granted the company a charter in 1600, Englishmen had been interested in the East, and had attacked both the overland route through the Middle East and the sea route round the Cape of Good Hope. At first the company was a small and struggling affair; but later dazzling dividends were won from it, and the British Empire in India, so recently liquidated, owed its origin to Queen Elizabeth's charter to a group of London merchants.

The company apparently never lacked a supply of surgeons, cast in the adventurous mould which fitted them to serve in ships on the long and perilous voyages to the East, which were also fraught with every conceivable medical and surgical hazard, and many of these surgeons spent long periods in the company's employ.

By 1612 the company found it necessary to have in London an official who would control the selection of surgeons and be responsible for furnishing them with the necessary medical equipment. It was the realization of this necessity that led to Woodall's appointment.

From now on the East India Company had a medical department; but, unfortunately, it was never really integrated into the corporate life of the company, and it is said to have compared unfavourably with that of the corresponding Dutch company.

Some of the duties of the Surgeon-General have already been mentioned. In the matter of the selection of surgeons, the tendency was for Woodall to appoint his own apprentices, and as a return for having taught them and then found them employment, he retained one-sixth of their wages. He found the recruitment of surgeons reasonably easy, because the stipend offered by the company was twice that paid to surgeons in the Queen's ships.

The furnishing of the surgeon's chest and the training of the surgeon in the use of its contents were other important duties which Woodall took very seriously. Certain duties in regard to the company's employees in London also devolved upon him. These included daily attendance at the shipyard, and the medical care of the men employed there and elsewhere by the company. Once in every forty-day period he was obliged either personally or by deputy to cut the hair of each employee, the remuneration for this service being twopence. One advantage which arose from this menial task was that each man was thereby subjected to an inspection, however cursory, once in that time. In practice it worked out that the apprentices did the barbering and the Surgeon-General pocketed the twopences.

At the end of a voyage, the Surgeon-General would check the unexpended medical stores in the ship, discuss the voyage with the surgeon and study the entries in the surgeon's journal, the keeping of which was enjoined by Woodall. By collating all the information which he gained in this manner, Woodall acquired a wide knowledge of seafaring matters which made up for his lack of actual personal experience in ships.

Woodall's long association with the East India Company was not always an harmonious one. It is recorded that on two occasions his remuneration was reduced, the first time from £30 to £20 *per annum*. He was accused of various abuses, such as supplying inferior materials for the surgeons' chests and appointing unskilled and insufficiently trained surgeons, who were described as "boys that have no skill". It was also alleged against him that he retained up to two-thirds of their wages for himself.

In 1617 Woodall published "The Surgeon's Mate", which was a manual for the sea-surgeons employed by the company. In this book he dealt at some length with scurvy, which disease took great toll of the crews of ships during the seventeenth century and a great part of the eighteenth century.

Of Woodall as an author and his writing about scurvy, more will be said later. We shall also trace later the influence of the medical department of the East India Company on the formation of a naval medical organization, because the company was the first to provide a central body that required its surgeons to furnish reports which, taken together, formed a most useful fund of medical knowledge.

There can be no doubt that, apart from certain periods of conflict, the merchants of the East India Company recognized that Woodall served them well and faithfully.

Woodall and the Virginia Company.

Another trading enterprise with which Woodall was connected was the Virginia Company, which was granted a charter by King James I in 1606. In this case Woodall's association was not related to his profession. He is said to have promised to subscribe £37 10s. to the company, but it is alleged that he failed to pay up. Unless the directors were singularly tolerant of such breaches of faith, it would appear that this story is untrue, because in 1620 a dispute arose between Sir Edwin Sandys, one of the prime movers in the foundation of the company, and Sir Thomas Smythe, and Woodall became involved in the fray and was suspended by the court of the company because of what was described as "a foule aspersion upon Sir Edwin Sandys". Another reason why he would appear to have been financial is that he was one of the members of the company who voted in 1623 for the surrender of the company's charter to the Crown.

Woodall engaged in the export of cattle to the colony, and is believed to have had an estate there which was run for him by an agent.

Woodall and Scurvy.

The study of Woodall's life and activities shows that the main reason for his being remembered is that he wrote about scurvy and is credited with being the earliest

advocate of the use of lemon juice as a cure for this condition.

The history of scurvy is the history of long ocean voyages.

One of the earliest references I have been able to find is that Richard I became ill with scurvy after the long voyage to Palestine to undertake his crusade. Various accounts of the disease have been given, and it has been described as "that plague of the sea and spoyle of mariners" and also as "that lazie, foul disease".

The men who undertook the great Portuguese voyages of the late fifteenth century all suffered severely from scurvy, as did those who went on some of the voyages of Hawkins, Frobisher and Drake; but strangely enough, there does not appear to have been any scurvy on Columbus' voyage in 1493.

In 1953 the University of Edinburgh celebrated the bicentenary of the publication of James Lind's book, "A Treatise of the Scurvy". As Lind was a graduate of the University of Edinburgh and a native of that city the celebration would appear to be an appropriate one; but its tone did not appeal to one writer, who wrote an historical study of the treatment of scurvy and took some pains to indicate that Woodall's contribution to the subject had been inadequately recognized in Edinburgh, where, he said, Lind's achievement had been celebrated "with some ceremony and a banquet largely consisting of vitamin C".

One of the earliest suggestions that the juice of lemons was effective against scurvy emanated from Sir Richard Hawkins, after a voyage in the ship *Daintie* in 1593. The company of Hawkins' ship suffered quite heavily from scurvy, and from observations made during the voyage he reached certain conclusions about the disease. He considered that the causes of scurvy were the salt foods, damp clothing and general lack of cleanliness, but the important thing was that he wrote: "That which I have found most fruitful for the sickness is sower oranges and lemmons". Sir Richard Hawkins was a leader with a keen mind and a deep sense of responsibility to his seamen, and he concluded his account of scurvy with a plea that the physicians and surgeons should investigate the disease as a matter of urgent national importance.

It is known that in 1598 the Dutch were aware of the efficacy of lemon juice as a cure for scurvy.

In 1601 Captain James Lancaster conducted what was really a splendid controlled experiment, which should have settled once and for all the matter of the prophylaxis and cure of scurvy. He had made three previous voyages to the East before setting out in that year in command of the first East India Company fleet. On the previous voyages he had, like many others, seen the health and efficiency of his ships' companies undermined by the dread disease. As a result of his experience and observations, he took an adequate supply of lemon juice in his flagship on the voyage of 1601, while the other ships of the fleet were not thus supplied. The results of this voyage, as far as the incidence of scurvy was concerned, should have clinched the matter; but once more, as with Hawkins' observation, the seemingly obvious inference was overlooked. We have seen that in 1612 Woodall began his long association with the East India Company, and in 1617 wrote "The Surgeon's Mate", which has already been referred to and will be spoken of again. In this book there was a very full account of scurvy, and the use of lemon juice for its treatment was advocated, although no claim for priority in this respect was made. There is little doubt that this was the first published work in which the treatment was advised.

We now come to an unfortunate circumstance, in that, having given an account of the disease and advocated lemon juice as a treatment, Woodall rather lost himself in speculation regarding the origin of the disease, and also gave alternative lines of treatment, so that the crucial point was submerged in a mass of useless material. Woodall was not alone in missing the point. Others, too, instead of appreciating that the lack of fresh fruit and vegetables caused scurvy, engaged in a whole lot of speculative theories, and this following of abstract theory prevailed over direct observation and experience. By introducing doubt and speculation Woodall failed to impress the powers of the East India Company, so that no action was taken by them, and scurvy continued to exact a heavy toll in the company's ships throughout the seventeenth century.

The later history of scurvy is worth a brief mention. James Lind, whose fame rests on his reformation of the naval medical service and on his work on scurvy, undertook the latter investigation because of the loss from scurvy of 626 out of 961 men who sailed in Anson's famous voyage round the world in 1740-1744. He published his findings in 1753 in the book mentioned earlier. Even then, nothing much was done about precautionary measures in the navy, and in 1780, in spite of Lind's work, 2400 men in the Channel Fleet had scurvy. In 1795, however, the prevalence of scurvy so endangered the fleet that the incredible blindness and obstinacy of the Lords of the Admiralty were broken down, and a regular supply of lemon juice was ordered. Strange and rather sad to relate, the merchant service did not follow suit for many years.

Woodall as an Author.

Scurvy has been given separate consideration because of its immense importance, but this was not the only subject upon which Woodall wrote. Altogether he wrote four books, and two of these were published later in one volume as a second edition of both.

Let us deal with these two books first. In 1617 Woodall published "The Surgeon's Mate", which had as a cumbersome alternative title "A Treatise Discovering faithfully and plainly the due contents of the Surgeon's chest, the uses of instruments, the cures of the most frequent diseases at sea". It was primarily a handbook for surgeons employed in East Indiamen, and was dedicated to Sir Thomas Smythe, who has already been mentioned as Woodall's mentor in the East India Company. "The Surgeon's Mate" was the most ambitious of his books and the one by which he is principally remembered, largely, perhaps, because of the long section devoted to scurvy. The rest of the book dealt with drugs and instruments in common use, and with the commoner surgical diseases. Woodall was most insistent that what he taught was based on his own practice and not on other men's views, so that it will be interesting to see what he did teach.

He advocated the application of caustics rather than incision in the treatment of abscesses, but was opposed to the excessive use of corrosives in ulcers.

His ideas concerning bowel disturbances make interesting reading. He recognized chronic constipation as being a bugbear of long voyages, and he showed a very marked aversion to the use of purgatives. For really intractable constipation with accumulated scyballa, he devised a spoon which was used to assist in the removal of these concretions. One of the most astounding of his teachings was that the introduction of tobacco smoke into the rectum had a beneficial effect on intestinal obstruction, and he devised an apparatus for applying this method of treatment. Writing in the *British Medical Journal* in 1874, Smart, once Inspector-General of Hospitals, R.N., a rank and appointment which no longer exists, stated that this apparatus was carried by naval surgeons until the first half of the nineteenth century, but he did not specifically state that it was used by them. In view of the widespread conviction, now current, that tobacco smoke is quite unsuitable for being drawn into the other end of the alimentary tract, I am sorry that I am unable to give any description of Woodall's apparatus; nor, I am afraid, did the use of a tobacco-smoke clyster establish itself as an enduring form of treatment. One innovation attributed to Woodall was the substitution of a trephine devised by him for the older brace-trepan. The older instrument was like a brace and bit, and the toothed cutting device was cylindrical, which meant that once the skull was penetrated it was apt to pass on and injure the underlying brain. Woodall's instrument was similar in some ways to the

Horsley trephine of a much later day; it was T-shaped, and consisted of a handle and a series of bits which could be fitted into this. One end of the handle was designed to serve as a smooth and the other as a rough "levatory" or elevator for raising the trephined or depressed bone. The bits were conical, being narrower at the cutting end, so that the likelihood of damage to the underlying brain was reduced provided that reasonable care was used. The development of modern burrs has led to a return of the brace-type instrument, but Woodall's trephine was used for a long time.

In his various books Woodall had a good deal to say about amputations, and I have collected some of what he said for discussion here. His attitude to amputation, which, in his hands as in those of his contemporaries, carried a high mortality, was a conservative one. This is reflected in his statement that "it is no small presumption to dismember the image of God", and in his reference to "that great and terrible instrument, the dismembering saw". He adjured the patient about to undergo amputation "to prepare his soul as a ready sacrifice to the Lord by earnest prayers". He advocated a guillotine-type amputation and the use of ligatures rather than the cautery for hæmostasis, and in the amputation of gangrenous limbs he advised that the level of section should be one inch below the line of demarcation so as to secure insensibility to pain.

One innovation in this field which he did much to advance was the suggestion that amputation of the foot could be performed successfully at the ankle. This suggestion is said to have arisen from the fact that Woodall knew that in the Indies malefactors were often punished by having both feet chopped off, and that after this gruesome punishment they were able to get about quite well with their stumps in crude bamboo baskets. It is held by some that Woodall's results in amputations were better than those of his contemporaries; but, whether this is so or not, he at least recorded them honestly.

Of fractures, Woodall wrote that "nothing cureth a bone so much as rest".

Woodall also laid down in "Surgeon's Mate" some ethical rules dealing with the surgeon's relations with his patients, his superiors and his ship. He warned sea-surgeons to abstain from criticism, vanity and addiction to "the pot and tobacco-pipe in unreasonable degree".

In 1628, two years after his association wth the navy began, Woodall wrote "Viaticum, being the Pathway to the Surgeon's Chest". In this book he devoted himself to the treatment of gunshot wounds, and in some ways it was the most interesting of his books. We cannot examine all that he taught about injuries by gunshot; but he did realize the importance of adequate drainage of these wounds in place of the practice, as he writes, of "cramming them full of bole or restringent powder, or some other stuff, and then thrust in pledgets or dossels into each corner of the wound, yea sometimes forgetting to take all out at the next dressing".

Also in 1628 he published his "Treatise on Gangrene and Sphacelos", which contained much of his advice on amputations, and was probably the most valuable of his works and governed surgical practice throughout the country for many years.

In 1639 Woodall published, firstly, a "Treatise on the Plague", which, although regarded as a mere pot-boiler, ran to four editions, the last in 1655, and, secondly, "The Surgeon's Mate or Military and Domestic Surgery" which, as already mentioned, combined the original "Surgeon's Mate" and "Viaticum" in an up-to-date form. This book he dedicated to Charles I, whom he praised for improved conditions in the naval medical service. This book became an obligatory possession for all sea-surgeons and remained so far about 150 years, which is no mean achievement for any author.

I think that the conclusion of this book is worth recording. In verse, it is as follows:

Let Surgeon's mates for whom I write,
be warned by me their friend
And not too rashly give a dose,
which then's too late to mend.
For many a good man leaves his life
through errors of that kinde,
Which I wish young men would avoide
and beare my words in minde.
Though Sulphur, Sal and Mercurie
having healing medicine store
Yet know th' have poyson and can kill,
prepare them well therefore.

In a general assessment of Woodall as an author, we can say that he showed powers of observation and a desire to extend the practice of surgery on a scientific basis. He spoke warmly of William Harvey and other physicians who were on the staff of St. Bartholomew's Hospital with him, but in general he appeared to have held physicians in dread rather than in reverence.

Woodall and the Navy.

Finally, we come to the association of Woodall with the navy. Time will not allow us to go into detail about the surgeon in the navy in the earlier Tudor period; but, as far as is known, no physician went to sea before the latter part of Elizabeth's reign, and there was certainly no semblance of a naval medical service at this time. However, at the end of the reign, surgeons and physicians were serving in both the navy and the army, and in accord with the general relation between the two divisions of the profession, the physicians were better paid.

Certain devices were used to supplement the pay of the surgeons. One was to make a deduction from the wages of the seamen for surgical services; victualling was free to the surgeons, and what were known as "dead pays" were utilized. These "dead pays" were the wages drawn for men whose names were on the ship's books, but who were not actually borne in the ship. Part of the proceeds of this dubious practice went to the surgeon.

The naval service was not popular, because medical supplies were unsatisfactory, ship-board life was most uncomfortable and the remuneration was regarded as inadequate. Because of this, vacancies in the Queen's ships had to be filled by impressment of surgeons, which was in the hands of the Barber-Surgeons Company. No advance in naval medical matters took place during the reign of James I.

King Charles I came to the throne in March, 1625, and two months later went to war with Spain, and the matter of providing surgical services for the fleet became an urgent one. In order to meet the demand, the King reaffirmed Henry VIII's charter to the Barber-Surgeons Company, and assigned to it the important duty of supervising the provision of medical supplies to meet the requirements of the seamen. The State, therefore, provided the equipment, but the deduction of 2d. a month from the seamen's wages to provide surgical services continued.

In 1626 John Woodall, because of his long medical association with the East India Company and his rising importance in the Barber-Surgeons Company, was appointed to execute the obligations of the company in relation to the provision of the naval surgeons' chests, and thus became virtually the first supervisor of the medical department of the navy. Somebody has said that the naval medical service was "born of no religion, the offspring of sheer necessity", and certain contemporary writings showed that the surgeon in the ship was regarded as a necessary member of the ship's company, but could not be wholeheartedly accepted by the professional seamen. In spite of the increasing influence of the medical officer in the navy of today, more than a trace of this attitude still remains.

To revert to the reign of Charles I, in which a new attitude to the medical needs of seamen is apparent, I have already pointed out how anxious Charles was to have

an efficient navy; the ships provided by the unpopular ship-money levy made possible for the first time the establishment of a national sea-going fighting force. On the medical side of this new navy many reforms were introduced.

The Chatham Chest, which had been established by Howard of Effingham, Hawkins and Drake in 1590 as the nucleus of a pensions scheme for those injured in the naval service, had had a chequered career, and had been subject to various depredations and peculations; but during the eleven years of Charles' personal rule it was properly supervised. It was during this period that the value of hospital ships was first recognized. First advocated in 1625, the policy of providing hospital ships was not followed to any extent until late in the Commonwealth.

The practice also developed of sending surgeons to various ports to meet the returning fleet and to help with the treatment and disposal of the wounded. Woodall on one occasion was in a party of four senior surgeons sent to Portsmouth on such a mission.

There is no doubt that the medical stores improved, and included a wider selection of more useful drugs than had obtained in Elizabeth's time. Woodall's chests did not always meet with approval, and protests were made at times, but he apparently weathered these storms.

The enduring conflict between physicians and surgeons extended even into the field of the naval medical service, with the former trying to impose an over-riding supervision of the Barber-Surgeons Company's activities. Finally, an arrangement was reached by which physicians, surgeons and apothecaries all made some contribution to the provision and supervision of naval medical supplies; but by 1633 the Barber-Surgeons Company had established itself in the predominant role in administering naval medical matters.

This last-named factor, coupled with an improved pay code and better supplies, made the recruiting of surgeons for the navy an easier and more satisfactory undertaking, and some surgeons began to regard service in the navy as a career rather than as an obligation reluctantly performed under compulsion. The result of this was the beginning of a medical service which has gone from strength to strength over the years, and for this John Woodall and the Caroline sea-surgeons must be given due credit. The central coordination in the navy was modelled on that of the East India Company, and John Woodall was the principal figure in each.

In Woodall's time the surgeon still ranked with the lower naval rates; but he was on the way up. His subsequent career does not concern us in this lecture.

Conclusion.

I have now reached the end of my account of John Woodall and his many activities.

Looking back over what has been said will, I think, make us agree that he was a man of drive and ability, with a sincere interest in his profession and a highly developed sense of public duty. He appears, too, to have been honest, perhaps to a degree in advance of his times, in the administration of public money.

He was not always free from turmoil and criticism, and was on occasion assailed with all the unrestrained invective characteristic of the age in which he lived.

He has not been accorded all the credit that is due to him; but my purpose has not been to establish another medical hero, but to put on record the achievements of one who was a great and influential man.

In conclusion, I should like to thank all those who have helped me in the preparation of this lecture with references, information and advice. In particular I should like to pay tribute to one book which has been of great help to me. This is the first volume of the late Surgeon Commander J. J. Keevil's work, "Medicine and the Navy".

SUPERFICIAL MYCOSES IN MELBOURNE.

By MARY MORTON, B.Sc.,
Medical Mycologist, Public Health Laboratory, Bacteriology Department, University of Melbourne.

DURING the eighteen-months period from December, 1957, to June, 1959, an investigation was conducted with two aims; it was desired firstly to establish what percentage of all skin infections seen in Melbourne were due to fungal infection and, secondly, to establish which pathogenic fungi were present and in what proportions. Apart from the survey published by Mancy (1952), no work on this subject has been reported from this State.

Accurate mycological diagnosis is important in the treatment, prognosis and epidemiological implications of infections due to fungi; this is particularly so in the case of the resistant organism *Trichophyton rubrum*. Since the introduction of griseofulvin therapy with its risk of complications, repeated cultural examinations, particularly of nails, have been necessary as an index of cure, so that therapy may be stopped as soon as possible. Donald (1959) emphasized the importance of distinguishing between ectothrix and endothrix hair infections. The latter generally follow a more chronic course with no tendency to spontaneous cure, and infected hairs fail to fluoresce under the Wood's lamp. Microscopic and cultural examinations are thus necessary to make the initial diagnosis and, after treatment, to discover whether the organism has been eradicated. In many cases it is possible only by mycological examination to establish the nature of a rash on the glabrous skin.

The following two independent surveys were conducted. The first series (Survey A) consisted of 125 patients attending dermatologists for treatment of various skin complaints. Skin scrapings were taken from 67 only, the remaining 58 being excluded on clinical grounds as having lesions not due to fungi. This brief survey covered a period of only two weeks in the month of May, 1958. The second survey (B) was conducted over the eighteen-months period from December, 1957, to June, 1959. This consisted of a selected group of 451 patients referred to the writer by dermatologists. All suffered from skin infections which clinically were attributed to fungous infection. Laboratory tests to prove this diagnosis were carried out, and positive findings have been classified mycologically. In this report the fungal species infecting different anatomical situations are analysed.

Among these 451 patients there were a few who were sent to the laboratory where material was collected directly from them; in the majority of cases material was taken by the clinician and sent to the laboratory, while in 47 instances fungus cultures were isolated elsewhere and submitted for identification.

COLLECTION OF SPECIMENS.

Skin scrapings were collected on to a glass slide with a blunt banana-shaped scalpel. The active periphery of the lesion was chosen for examination, and white macerated material was avoided. Scrapings from each suspected site were examined and cultured independently.

Large portions of affected nail were removed with nail clippers, and heaped-up subungual debris was collected with a blunt scalpel. Nails which were discoloured near the nail bed were scraped with a blunt scalpel.

The whole head was examined under a Wood's lamp. Roots of hairs from areas showing fluorescence were removed with Whitfield's flat-edged forceps; scrapings from the surrounding skin were also taken. If there were no fluorescing hairs, a search was made with a lens for lustreless or broken hairs and these were removed.

DIRECT MICROSCOPIC EXAMINATION.

Skin fragments 2 to 3 mm. in diameter and fine scrapings were placed on a glass slide, a drop of 30% potassium hydroxide solution was added and a coverslip was placed on top. The slide was heated gently over a Bunsen flame in

order to soften and "clear" the specimens. The coverslip was pressed gently, and excess alkali was removed by blotting. With the 10× objective a search was made for fragments of mycelium, which varied from short to very long. If they were seen, their nature was confirmed with the 40× objective.

Thin shavings of nail were treated exactly as described above. Thicker pieces were placed in a small test tube, covered with 30% potassium hydroxide solution and incubated at 37° C. for one to two hours. Specimens which could not be examined until next day were immersed in 7% potassium hydroxide solution and left at 37° C. overnight. The gelatinous material was squashed with a Pasteur pipette, and a drop placed on a glass slide, warmed, pressed gently and examined under the microscope for mycelial fragments, as described for skin scrapings.

Hair stumps were examined as described for skin, but 7% potassium hydroxide solution was used. It was important not to press the coverslip too firmly, as hairs disintegrate easily.

Infected hair stumps presented one of two different appearances: (i) The shaft was covered by a sheath of spores. These were small (2 to 3μ) in the case of *Microsporum canis* and *M. audouini* or larger (4 to 6μ) in the case of *T. verrucosum*; thus infections were small-spored and large-spored ectothrix respectively. (ii) Chains of spores (4 to 6μ) were seen inside the hair shaft; that is, the infection was of the endothrix type. All these were due to *T. sulphureum*.

Isolation of Organisms.

Skin.

About four pieces of skin (approximately 3 mm. in diameter) or heaped-up scrapings were inoculated 1·5 cm. apart into the surface of each of two malt agar slopes, one with and one without antibiotics. A wire inoculating tool was used to transfer the material and to bury it partly in the agar. The instrument was made by flattening the curved end of an eight-inch length of fifteen-gauge "Nichrome" wire. The edges were then rounded with a file.

Cultures were incubated at 26 to 30° C. and examined every three to four days for yeast or filamentous growth. If a mixed culture developed, any likely pathogen was reinoculated on to a fresh slope. Colonies could usually be identified within two weeks, but some grew very slowly and none was discarded until four weeks had elapsed.

Nail.

Large pieces of nail were held with forceps and pared with a sharp scalpel. The parings were collected into heaps on the inoculating tool and seeded as described above at intervals along each of two slopes.

Hair.

Affected portions of hair were cut into lengths of about 3 mm. and cultured as described above. The roots were inserted into the medium, the shaft being left projecting.

Nomenclature.

The species names used are those recommended in the Medical Research Council Memorandum No. 23 (1958). The following list includes those organisms the nomenclature of which sometimes causes confusion:

Name Used.	Synonym.
Microsporum canis	*M. lanosum*
Trichophyton verrucosum	*T. discoides*
Trichophyton rubrum	*T. purpureum*
Trichophyton mentagrophytes	*T. gypseum*
Candida albicans	*Monilia albicans*

T. sulphureum is used for the organism of the crateriform group which produces a yellow surface pigment, and *T. tonsurans* for that which produces a white one.

Identification of Cultures.

Subcultures on to various media, slide cultures and in-vitro hair cultures (Ajello and Georg, 1957) were made if necessary to identify various species.

Cultures were examined macroscopically, and lactophenol blue mounts from them were examined microscopically. Table I lists the chief cultural characters used for identification.

Media.

1. Malt agar. This consisted of 4% malt extract and 1·5% agar in tap water. To suppress contaminating bacteria, saprophytic moulds and yeasts, penicillin (40 units per millilitre), streptomycin (40 μg. per millilitre) and "Actidione" (cycloheximide) (0·5 mg. per millilitre) were added.

2. Sabouraud's medium (glucose peptone agar). This consisted of 4% glucose, 1% mycological peptone (oxoid) and 1·5% agar in tap water.

3. Rice grains. These were prepared from 7 grammes of rice and 28 ml. of water. The water was added to the grains and the mixture was autoclaved at 120° C. (15 lb.) for 15 minutes.

4. Thiamin medium. Thiamin medium for the dysgonic variant of *M. audouini* was prepared as described by Walker (1950). To a basic medium were added graded amounts of thiamin varying from 0·2% to 2·0%.

5. Casein agar. The medium was prepared as described by Georg and Camp (1957), and vitamins were added to give the following final concentrations: (i) thiamin-casein agar, thiamin hydrochloride 0·2 μg. per millilitre; (ii) inositol-casein agar, i-inositol 50 μg. per millilitre; (iii) thiamin-inositol casein agar, thiamin 0·2 μg. per millilitre and inositol 50 μg. per millilitre.

6. Corn meal agar. This was prepared as described by Hazen and Reed (1955).

7. One per centum peptone agar. This consisted of 1% "Bacto-Peptone" (Difco) and 2% agar in tap water (Morton, 1955).

8. Three per centum peptone agar (Sabouraud's preserve). This comprised 3% "Eupepton" (No. 2, Allen and Hanburys) and 1·5% agar in tap water.

9. Slide culture. Slide culture was carried out by the method perfected by Dr. J. T. Duncan, and described by Smith (1954).

Results.

Survey A.

Of the 125 patients in this series, 58 were excluded on clinical grounds. There remained 67, and from only five of these pathogenic fungi were isolated. These were *C. albicans* from a finger-nail bed and a vaginal swab, *E. floccosum*, from toe webs, and *T. mentagrophytes* from a hand and arm. These represented a 4% incidence of mycosis in skin infections seen by dermatologists.

Of 275 cases investigated by Dr. Mancy (personal communication) eight (3%) were proved to be due to fungous infection, one was doubtful and 266 were of non-fungal origin.

Survey B.

In this series of 451 cases were included 47 cultures received for indentification. These comprised 29 pathogenic and 18 saprophytic fungi. The pathogens consisted of the following: *C. albicans*, eight; *T. rubrum*, five; *M. audouini* dysgonic type, five; *T. verrucosum*, two; *T. violaceum*, two; *T. sulphureum*, two; *M. canis*, one; *T. schoenleini*, one; *T. mentagrophytes*, one; *E. floccosum*, one; unidentified, one—this was either *T. schoenleini* or *T. verrucosum*.

The saprophytic fungi were as follows: *Trichosporon* sp., one; *Rhodotorula* sp., two; *Alternaria* sp., one; *Cephalosporium* sp., one; *Stemphyllium* sp., one; *Scopulariopsis brevicaulis*, three; *Penicillium* sp., two; *Geotrichum* sp., two; *Cladosporium herbarum*, one; *Aspergillus flavus*, one; *A. niger*, one; unidentified yeast, one; unidentified culture, one.

From the remaining 404 patients, 163 cultures of pathogenic fungi were isolated. These consisted of *M. canis* (48), *T. rubrum* (45), *T. mentagrophytes* (28), *C. albicans* (18), *E. floccosum* (13), *T. verrucosum* (six) and *T. sulphureum* (five).

A total of 612 specimens were examined from the 404 patients. Table II summrizes the results obtained.

Thus, 235 cultures of pathogenic fungi were obtained from 612 specimens. Only 197 of these specimens gave positive findings on direct microscopic examination.

TABLE I.

Cultural Characters Used for Identification of Pathogenic Fungi.

Organism.	Medium.	Salient Macroscopic Features of Colonies.	Salient Microscopic Features of Colonies.
M. canis	Malt or Sabouraud's agar. Rice grains.	White, fluffy surface; yellow pigment in reverse. Aerial growth.	Numerous large boat-shaped multiseptate macroconidia.
M. audouini (dysgonic type).	Malt or Sabouraud's agar. Rice grains. Walker's thiamin media.	Poor, greyish growth, submerged; confined to areas of inoculation. No growth. Aerial growth increased to maximum between 0·6% and 0·8% concentration of thiamin.	Hyphæ and a few microconidia only.
T. sulphureum	Sabouraud's agar. Malt agar.	Yellow crater-like surface. Flat surface, yellow, powdery.	Elongated microconidia along sides of hyphæ. Chlamydospores in old cultures.
T. verrucosum	Horse-blood agar and 1% glucose nutrient agar (37° C.). Casein agar plus vitamins.	Poor, slow, waxy growth below surface of medium. Requires thiamin or thiamin plus inositol.	Chlamydospores only.
T. schoenleini	Glucose nutrient agar (1%). Casein agar and vitamins.	Poor, slow, waxy growth beneath surface of medium, later aerial, convoluted. Grows on casein vitamin-free agar.	Favic chandeliers and chlamydospores.
T. violaceum	Malt or Sabouraud's agar.	Waxy colony; entire surface reddish purple. Slow-growing.	Hyphæ and chlamydospores only.
T. rubrum	Malt or Sabouraud's agar. In-vitro hair culture.	White, fluffy or granular surface; red pigment developed in three or four weeks in reverse. Does not perforate hair.	Microconidia along sides of hyphæ.
T. mentagrophytes ..	Malt agar. In-vitro hair culture.	White fluffy or granular surface; variable, colourless to brown pigment in reverse. Organism perforates hair.	Microconidia in grape-like clusters. Spiral hyphæ. Occasional macroconidia.
Epidermophyton floccosum	Sabouraud's agar. Malt agar.	Greenish-yellow, powdery surface with central white fluffy area. Flat, powdery sulphur-yellow.	Club-shaped macroconidia in clusters. Chlamydospores numerous in old cultures.
Candida albicans ..	Peptone agar (1%), 24 hours plate, 37° C. Corn-meal agar plate, 48 hours, 26° C.	Colonies surrounded by spidery or feathery outrunners.	Chlamydospores.

Species of Fungus Isolated from Each Clinical Condition.

Infection was not always confined to a single situation—for example, the head and body or feet and hands were sometimes involved; but for descriptive purposes the presenting site will be considered the primary one. Table III summarizes the distribution of fungi in each clinical condition.

Tinea Capitis.

Specimens from 83 suspected cases of tinea capitis were received. Pathogenic fungi were cultured from 45 patients and *Staph. aureus* from one. The fungi consisted of *M. canis* (29), *M. audouini*, dysgonic type (five), *T. sulphureum* (six), *T. verrucosum* (two), *T. schoenleini* (one), *T. violaceum* (one), and unidentified culture which was either *T. schoenleini* or *T. verrucosum*.[1]

M. Canis Infections.—From these figures it will be seen that *M. canis* is by far the most common cause of tinea capitis in Melbourne. The 29 patients included two kittens and one show dog. *M. canis* was isolated from the head of an adult woman whose clinical condition was seborrhœic dermatitis. Insufficient histories were obtained from some patients; but, as far as is known, all the remaining patients were children between the ages of 18 months and 13 years, including an aboriginal girl, aged two years, from Alice Springs.

Three patients gave a definite history of contact with an infected cat.

The first of these, a small boy, suffered from lesions on the body as well as the head, and the second from lesions of the head and limbs.

The sister of the latter child was reported to have a similar eruption on the extremities, but no specimen was received for examination.

The third child with a definite history of contact with an infected cat was a girl aged six years. Her mother had a red, scaly patch on her arm, from which *M. canis* was isolated, and her brother, aged seven years, had a round, red, scaly patch on his body. Microscopic examination of scrapings from the latter revealed hyphæ, but the culture gave a negative result.

TABLE II.

Results Obtained from Direct Microscopic Examination and Culture of Specimens.[1] [2]

Results.	Number of Specimens.
M+ C+	154 (26·2%)
M− C+	73 (12·4%)
M+ C−	38 (6·4%)
M− C−	323 (55%)
Total	588

[1] M, direct microscopic examination; C, culture.

[2] Not included in these figures were specimens from 24 cases in which there was insufficient material for examination by both methods. Of the 10 studied only by direct examination, five gave positive results, while of the 14 examined by culture, eight gave positive results.

The mother of another child, a small boy, was reported to have a lesion on her shoulder, but no specimen was received for examination.

A boy, aged 13 years, had a pustular lesion on his left arm, as well as a lesion at the nape of his neck.

[1] This culture unfortunately died out before it could be specifically identified.

TABLE III.

Distribution of Fungi in Each Clinical Condition.

Organism.	*T. capitis.*	*T. barbae.*	*T. corporis.*	*T. cruris.*	*T. pedis.*[1]	*T. unguium.*[2]	Paronychia.	Vulvovaginitis.	Perianal Candidiasis.	Perlèche.	Site Unknown.	Total Organisms.
M. canis ..	29	—	15	—	5	—	—	—	—	—	—	49
M. audouini (dysgonic type)	5	—	—	—	—	—	—	—	—	—	—	5
T. sulphureum	6	—	1	—	—	—	—	—	—	—	—	7
T. verrucosum	2	—	6	—	—	—	—	—	—	—	—	8
T. schoenleini	1	—	—	—	—	—	—	—	—	—	—	1
Unidentified— ? *T. schoenleini*, ? *T. verrucosum*	1	—	—	—	—	—	—	—	—	—	—	1
T. violaceum	1	—	1	—	—	—	—	—	—	—	—	2
T. rubrum ..	—	1	2	—	27	20	—	—	—	—	—	50
T. mentagrophytes ..	—	—	2	—	24	2	—	—	—	—	1	29
E. floccosum ..	—	—	1	4	7	1	—	—	—	—	1	14
C. albicans ..	—	—	—	1	3	10	4	2	1	1	4	26
Total patients	45 (23·7%)	1 (0·5%)	28 (14·6%)	5 (2·6%)	66 (34·2%)	33 (17·2%)	4 (2·1%)	2 (1·0%)	1 (0·5%)	1 (0·5%)	6 (3·1%)	192 (100%)

[1] For more detailed information see Table V.

[2] For more detailed information see Table VI.

In all other cases the infection was confined to the scalp.

The results obtained on laboratory examination of the hairs are set out in Table IV.

The foregoing results were obtained on examination of hairs sent to the laboratory, not from direct examination of patients' heads. Seven specimens did not show green fluorescence under the Wood's lamp. Fluorescence

TABLE IV.

Results Obtained from Wood's Lamp and Microscopic Examination of Hairs Infected with M. canis.[1]

Results.	Number of Cases.
F+ M+	20
F− M+	3
F+ M−	1
F+ −	1
F− M−	4
Total	29

[1] F+ = green fluorescence under the Wood's lamp; M+ = positive result on direct microscopic examination, the small-spored ectothrix arrangement being found; M− = negative result on direct microscopic examination.

may depend on the degree of infection of the hair, or these seven negative results may be due merely to selection of material. However, not included in this survey is one definite case of non-fluorescent *M. canis* infection of the head of a boy, aged five years.

Culture in all 29 cases yielded *M. canis*. Cultures were identified as indicated in Table I.

Over a period of eight months, an experiment was conducted to estimate the viability of *M. canis*. Several hairs were collected from a patient suffering from tinea capitis due to *M. canis*. At intervals of six weeks, one hair was inoculated on to malt agar. After eight months, growth was still obtained. As the supply of infected hairs was exhausted, the experiment could no longer be continued, but is was established that this organism can remain viable in infected hairs for at least eight months. This fact may be of epidemiological importance.

M. Audouini Infections (Dysgonic Type).—Cultures which had been isolated from the heads of five children from a mental home were received for identification. Subsequently the organism was again isolated from the hairs of these five children. These cases will be reported more fully elsewhere.

Under Wood's lamp, hairs from all five patients showed green fluorescence, and microscopic examination revealed the small-spored ectothrix type of infection.

Cultures were identified as indicated in Table I. Particular attention was paid to the stimulation of aerial growth on media enriched with thiamin (Walker, 1950).

T. Sulphureum Infections.—T. sulphureum was isolated from the hairs of the heads of the following six patients:

CASES I and II.—A boy, aged nine years, born in Malta, and his sister, aged three years, born in Australia, were the patients. Both had played with a girl, aged 10 years, born in Malta, who was said to have had an infected head. Five months later the organism was again isolated from the hairs of the girl.

CASE III.—The patient was a girl, aged five years. No history was obtained except for a clinical diagnosis of pityriasis capitis. Four months later the organism was again isolated, together with *M. canis*.

CASE IV.—The patient was a boy, aged 10 years, with lesions on the neck and scalp. The clinical diagnosis was "? kerion ? *Trichophyton* infection ? Trichotellomania". Two months later culture produced a negative result.

CASE V.—The patient was a boy, aged two years, with a history of a red patch and crusting on the scalp. The clinical diagnosis was seborrhœic dermatitis. Two months after the original isolation the result of culture was still positive, but after another two months it was negative; however, three months later areas of redness and scaling in the scalp had reappeared, and culture again produced a positive result. The patient's sister, aged six months, had a ring-shaped lesion on the neck; her case is mentioned in the section on tinea corporis.

CASE VI.—The patient was an adult man, of whom the only information received was a clinical diagnosis of alopecia areata.

Laboratory examination of hairs from the six patients yielded the following results. Under the Wood's lamp none showed green fluorescence, although those in Case III appeared discoloured or greyish along the entire length. On direct microscopic examination, hairs of four patients showed the endothrix type of spore invasion, those of a fifth patient showed a cluster of spores in no definite arrangement, and no spores were seen in hairs from a sixth patient.

T. Verrucosum Infections.—There were two cases of *T. verrucosum* infection of the hair, both in children. In each case cultures which had been grown from hairs

were received for identification. No history was obtained about one patient. The other, a boy, aged six years, had had a crusted eruption on the scalp for three weeks, and had no known contact with animals.

As cultures only were received, the diagnosis depended entirely on their cultural identification; direct microscopic examination of hairs in potassium hydroxide solution, which would distinguish between *T. verrucosum* and *T. schoenleini*, was not possible. Both cultures grew well on glucose nutrient agar, 3% peptone agar and Sabouraud's agar, and gave some cerebriform waxy growth as well as submerged growth. Microscopically only hyphæ and chlamydospores were seen. On those features it was not possible to decide whether the organisms were *T. verrucosum* or *T. schoenleini*.

The first strain was identified as *T. verrucosum* by Dr. J. Walker, of the London School of Hygiene and Tropical Medicine.

Nutritional tests were carried out on the second culture by the writer. Growth from a Sabouraud's agar slope was inoculated on to slopes of casein agar, casein agar plus inositol, casein agar plus thiamin, and casein agar plus thiamin and inositol. No growth was obtained on the first two slopes, and equal amounts were obtained on the second two. This organism required thiamin for growth and could thus be distinguished from *T. schoenleini*. Georg and Camp (1957) found that of 100 strains of *T. verrucosum* examined, 84 required thiamin and inositol for growth and 16 required only thiamin. Georg (personal communication) states that she has encountered three strains of *T. schoenleini* which were stimulated by thiamin, but none which did not grow at all on vitamin-free media. *T. verrucosum* requires the intact thiamin molecule, while all *T. schoenleini* strains encountered could utilize pyrimidine; Georg confirmed that the above-mentioned culture was *T. verrucosum*, since it was unable to use pyrimidine instead of thiamin.

T. Schoenleini Infection.—One culture from a case of favus of the scalp was received for identification. No hairs were received. The patient was a girl, aged 10 years. X-ray epilation resulted in a successful cure. The absence of growth from hairs received for culture five months later confirmed this. By macroscopic and microscopic examination of the culture on glucose nutrient agar it was not possible to distinguish it from *T. discoides*. However, growth was obtained on casein vitamin-free agar, and this confirmed the organism as *T. schoenleini*. This case will be reported more fully elsewhere.

Unidentified Culture.—One culture received for identification resembled *T. verrucosum* or *T. schoenleini*. This was before information was available on the nutritional tests of Georg and Camp, and it was not possible to name the organism. The culture died prior to the introduction of these tests into the laboratory.

T. Violaceum Infection.—One culture from the hairs of an aboriginal child was received for identification. No further history was received. Direct microscopic examination of the hairs was not possible. The culture resembled *T. violaceum* macroscopically and microscopically.

Tinea Barbæ.

Hairs and scales from the beard of one patient with tinea barbæ were received. A man, aged 27 years, had a three weeks' history of raised papular lesions in the beard area. Direct miscroscopic examination of the hairs and scales in potassium hydroxide solution showed spores and hyphæ respectively. Neither showed fluorescence under the Wood's lamp. Culture of both hair and scales yielded *T. rubrum*.

Tinea Circinata (Corporis).

Specimens were received from 97 patients, of which 28 yielded positive cultures. These were as follows: *M. canis*, 15; *T. verrucosum*, six; *T. rubrum*, two; *T. mentagrophytes*, two; *E. floccosum*, one; *T. sulphureum*, one; *T. violaceum*, one.

M. Canis Infections.—As in the case of tinea capitis, *M. canis* is by far the most common cause of tinea corporis in Melbourne. It was isolated from the following sites: under the left eye, one case; face, one case; chin, one case; trunk, three cases; trunk and head, two cases; leg, two cases; neck, one case; arm, three cases; hand, one case.

Of the 15 patients 10 were children aged between three and 13 years, and five were adults.

There were three patients with a definite history of contact with an infected cat or kitten. Two children in this group had lesions on the head and body; both parents and a brother of one of these were also reported as being infected. The third patient was an adult woman with lesions on the arm; her small son was also reported as being infected.

Two sisters, aged 10 and 12 years, both infected, had an infected pup. Another girl, aged 10 years, had spent a holiday at a dairy-farm, where the cows were said to have ringworm; the whole of her family subsequently became infected, but unfortunately specimens were obtained only from the girl.

A boy with leg lesions had a sister with an infection of the head due to *M. canis*. No history was obtained.

On direct microscopic examination of skin scrapings from the 15 patients, hyphaæ were found in 12. In every case *M. canis* was grown.

T. Sulphureum Infection.—A girl, aged six months, had a ring-shaped lesion on the neck. Direct microscopic examination was negative but *T. sulphureum* was grown. This organism was isolated three times from the head of her two-year-old brother (Case V).

T. Verrucosum Infections.—The six patients with *T. verrucosum* infections presented the following histories.

CASE VII.—A dairy-farmer, aged about 50 years, presented with a large swollen pustular area, of kerion type, on the right forearm, of four weeks' duration; it had flared up during the last seven days. He gave a history of treating calves which were said to have sores but, unfortunately, no specimens were received from these.

CASE VIII.—An Italian, aged about 30 years, had two pustular, swollen lesions on the left forearm, 1·5 by 1·5 inches and 2·0 by 2·0 inches in area. He was employed at a local meatworks slaughtering cattle.

CASE IX.—A farmer, aged 42 years, two months prior to examination had bruised the outside of his right thigh over a very small area on the horn of a calf. The skin was not broken. Three weeks later the skin on the injured area became red. It was not painful or itchy. Yellow-headed pimples appeared over this part. These spread locally and on to the back of the left shoulder. Further examination revealed a circular, nodular, boggy patch about 3·5 inches in diameter on the extensor aspect of the right thigh, about the middle. There were a few small pustules and some semi-attached scales on the surface. There was another similar, much smaller patch below it, and another of similar size just below the left knee.

CASE X.—A slaughterman, aged 32 years, presented with an inflammatory ringworm of the right forearm and a scaly area of the right shoulder. The story was that he had injured his arm with an implement, severing a nerve. His arm was put in plaster and it healed, but a large lump discharging pus developed beneath the plaster. This had persisted for one month prior to examination for fungi. The organism was cultured from both sites.

CASE XI.—The wife of the slaughterman in Case X developed a round patch on her right arm one week before examination.

CASE XII.—No history was obtained.

Two patients visited the laboratory, where hair, skin scrapings and pus were taken for examination. Specimens of hair or skin scrapings were received from two others, and from the remaining two, cultures were received for identification.

Laboratory examination of specimens yielded the following results. Hairs showed no fluorescence under the Wood's lamp, but microscopic examination showed the typical large-spored ectothrix arrangement. Of the three

specimens of skin examined, two showed hyphæ or chains of arthrospores, and in one no abnormality was found. Gram-stained preparations of pus showed numerous polymorphonuclear cells but no organisms, except for a very occasional round organism surrounded by a halo or capsule. On culture, it was found that the most profuse and rapid growth was obtained from pus inoculated on to horse blood agar and incubated at 37° C. Here, seven days' incubation was sufficient for identification, whilst only a small amount of growth was obtained in this time on glucose nutrient agar. Cultures from the first three patients were found to require thiamin and inositol for growth. Nutritional tests were not performed on cultures from the remaining three patients.

T. Violaceum Infection.—A culture from the glabrous skin of a small boy was received for identification. He was a hospital contact of an aboriginal boy with tinea capitis due to *T. violaceum*. The culture was identified as *T. violaceum*.

T. Rubrum Infections.—The two patients suffering from tinea corporis due to this organism presented the following histories.

CASE XIII.—An adult male had suffered from a rash on the buttocks for six months. On examination of the patient, there was an erythematous papular eruption on the buttocks with a well-defined edge. The clinical diagnosis was "? fungal infection, ? seborrhœic dermatitis". Direct microscopic examination of skin scrapings gave negative results, but culture yielded *T. rubrum*.

CASE XIV.—A woman, aged 25 years, had a red, ring-shaped area on her face. Direct microscopic examination of skin scrapings showed hyphæ, and culture yielded *T. rubrum*.

T. Mentagrophytes Infections.—Two patients suffering from tinea corporis due to *T. mentagrophytes* presented the following histories.

CASE XV.—A child, aged 15 years, had a ring-shaped area on the chin. The provisional diagnosis was seborrhœic dermatitis. Direct microscopic examination of skin scrapings showed hyphæ, and on culture *T. mentagrophytes* was grown.

CASE XVI.—A woman, aged 35 years, had a rash on her right hand and arm. She was employed at a laboratory, where she handled mice. Three other women were said to have had a similar rash, which seemed most frequent in spring. Direct microscopic examination of skin scrapings showed hyphæ, and on culture *T. mentagrophytes* was grown.

E. Floccosum Infection.—An adult male had an eczematous lesion for one month on the right wrist, and an erythematous scaly eruption of the groin. Hyphæ were seen on direct examination of skin scrapings from the wrist, and *E. floccosum* was grown, but scrapings from the groin gave entirely negative findings.

Tinea Cruris.

Skin scrapings from the groin were received from 13 patients, 12 men and one woman. Positive cultures were obtained from five men patients. They consisted of four cultures of *E. floccosum* and one of *C. albicans*. In one case *E. floccosum* was also isolated from the interdigital clefts of the feet.

The four patients from whom *E. floccosum* was isolated gave a history of six to eight weeks' duration, and the infection with *C. albicans* was of twelve months' duration.

The "negative" cultures were from patients with clinical diagnoses of tinea cruris, eczema, neurodermatitis or intertrigo.

The four specimens from which *E. floccosum* was grown showed hyphæ on direct examination, and that from which *C. albicans* was grown showed no hyphæ. One specimen which showed hyphæ on direct examination failed to grow a fungus.

Tinea Pedis.

Specimens from 150 suspected cases of tinea pedis were received; pathogenic fungi were cultured from 66 patients. The results obtained may be summarized as follows:

Number of patients examined	150
Number of specimens	300
Number of patients with positive cultures	66
Total number of isolations	104

Frequently it was necessary to examine not only the interdigital clefts and soles of the feet, but also the toe-nails, hands and finger-nails. This accounts for the large number of specimens and isolations from the comparatively small number of patients.

The fungi isolated were: *T. rubrum*, 27; *T. mentagrophytes*, 24; *E. floccosum*, seven; *M. canis*, five; *C. albicans*, three. Their distribution is listed in Table V.

T. rubrum was the most frequent organism isolated in cases of tinea pedis. There were 10 cases in which *T. rubrum* also involved the nail; these are also included in the section of tinea unguium. Of the 12 cases in which it was isolated from the soles only, in four there was a history of toe-nail involvement, and in one of hand involvement, but the organism was not isolated from these sites.

This infection can be extensive, as is seen in the following two examples:

CASE XVII.—An adult woman had had a circinate rash on her right leg for years. The skin and nails of both feet and hands were infected, and the rash had spread up one leg almost to the knee. *T. rubrum* was isolated from all these sites except the finger-nails, where *C. albicans* was isolated.

CASE XVIII.—A woman, aged 26 years, had had a chronic disorder of the finger-nails and toe-nails for 15 years, at times associated with a vesicular eruption of the hands and feet. *T. rubrum* was isolated from the toe-nails of both feet, from skin scrapings of the left foot and from the nails of the left hand. *T. mentagrophytes* was isolated once from toe-nails and feet. Confirmatory tests were not possible.

E. floccosum was isolated three times from the feet of one man over a period of nine months. It had been isolated three and a half years previously in London.

Another patient suffered from a skin eruption of the upper parts of the thighs and the groin and from scaling between the toes. *E. floccosum* was isolated from both sites.

M. canis was isolated from the interdigital clefts or soles of five patients, all in the care of the same doctor, between mid-August and mid-September, 1958. It was regarded as of dubious significance. *T. mentagrophytes* was subsequently isolated from one of these patients. Further specimens were not received from the other patients.

C. albicans was isolated from the interdigital clefts of the feet of three patients only.

Tinea Unguium and Associated Skin Infections.

The total number of patients examined was 75. Clinically, infection was confined to the finger-nails or the finger-nails and hands of 27 patients, to the finger-nails, hands, toe-nails and feet of 23 and to the toe-nails and feet of 20; in five cases nail clippings were received, with no indication of site. All stages of discoloration were seen, to heaping-up and destruction of the nails. The collection of specimens was guided by the clinical appearance.

Fungi were grown from the nails of 33 patients, and Table VI summarizes the results obtained.

T. rubrum was also grown from skin scrapings of 12 of the 20 patients. In four cases it was isolated from the hands, in four from the feet, and in four from both hands and feet.

In no patient had *C. albicans* spread from the finger-nails to the skin. One patient suffered from monilial vaginitis as well as from an infected thumb nail. In another case *C. albicans* was isolated from the patient's right finger-nails and *T. rubrum* from the toe-nails, feet, right leg and both hands.

The following histories were obtained from patients from whom *T. mentagrophytes* was isolated.

CASE XIX.—A man had probable tinea pedis accompanied by vesicular eruption of the hands. *T. mentagrophytes* was grown from the toe-nails and interdigital clefts of both feet. No growth was obtained from the hands.

CASE XX.—A woman had had discoloration and dystrophy of the nails for three years, and lesions between the toes in

TABLE V.
Distribution of Fungi in Infections of the Feet.

Organism.	Number of Patients.	Sites from which Isolated.					
		Soles and Interdigital Clefts of Feet.	Feet and Hands.	Feet, Hands and Toe-Nails.	Feet and Toe-Nails.	Feet and Finger-Nails.	Feet, Toe-Nails and Finger-Nails.
T. rubrum	27	12	5	4	4	1	1
T. mentagrophytes	24	23	—	—	1	—	—
E. floccosum	7	7	—	—	—	—	—
M. canis	5	5	—	—	—	—	—
C. albicans	3	3	—	—	—	—	—
Total	66	50	5	4	5	1	1

summer. *T. mentagrophytes* was grown from both big toe-nails only.

E. floccosum was isolated once from finger-nails. The history was as follows:

A man had had a generalized skin eruption involving the hands, feet and toe-nails for fifteen years since he served in New Guinea during the war. The condition had improved over the last five years. Finger-nail clippings were taken, together with scrapings from the left hand and right arm. *E. floccosum* was grown from the finger-nails only.

Paronychia.

Four cases of paronychia were encountered; *C. albicans* was isolated in all of them. Three of these patients had associated infections of the finger-nails as well as of the nail bed. These three cases are included in the 10 cases of tinea unguium due to *C. albicans* mentioned previously. The histories were as follows.

CASE XXI.—The patient had paronychia around all 10 fingers. *C. albicans* was isolated from nail scrapings.

CASE XXII.—The patient had chronic paronychia on the right forefinger and left thumb. The thumb-nail had a yellow, opaque appearance. *C. albicans* was isolated from clippings of the right forefinger nail and from the left thumb-nail.

CASE XXIII.—This patient had had paronychia of the left thumb for years, with recent spread to the right forefinger nail. *C. albicans* was isolated from the left thumb-nail, the right forefinger nail and washings from the base of the left thumb nail.

CASE XXIV.—Pus from the base of the finger-nail was received. The patient had a recurrent infection. Hyphæ were seen in a stained preparation, and *C. albicans* was isolated.

Vulvo-Vaginitis.

Five vaginal swabs were received. On examination of Gram-stained smears, none showed either yeast cells or hyphæ. *C. albicans* was grown from two.

Perianal Candidiasis.

One perianal swab was received from a man. Examination of a Gram-stained smear showed neither yeast cells nor hyphæ, but the culture yielded *C. albicans*. No history was available.

Perlèche.

Swabs were obtained from the corners of the mouths of four patients; *C. albicans* was isolated from one of them.

Infections of the Axilla.

Tinea Axillaris.—Skin and hair from the axilla of one patient were received. Culture yielded *M. canis*. However, this organism failed to grow when culture was repeated. The patient had had an area of dermatitis of the left axilla for six weeks, spreading peripherally and clearing. The provisional diagnosis was tinea axillaris.

Trichomycosis Axillaris.—Hairs from two patients with clinical trichomycosis axillaris were received, and were examined in 7% potassium hydroxide solution under the 40× objective. The nodule of trichomycosis axillaris was clearly demonstrated in hairs from the axilla of one patient, an Italian. The hairs were cultured on horse blood agar. Stained preparations of the growth obtained contained Gram-positive cocci and Gram-positive diphtheroid-like bacilli.

Erythrasma.—Skin scrapings were received from the axilla of two patients and from the axilla and groin of one patient. All were clinically suffering from erythrasma. Direct microscopic examination of the material in potassium hydroxide solution under the 90× objective failed to demonstrate the fungal elements.

TABLE VI.
Species Distribution of Fungi Isolated from Nails.

Organism.	Number of Patients.	Sites.			
		Toe-Nails.	Finger-Nails.	Toe-Nails and Finger-Nails.	Not Known—? Toe-Nail or Finger-Nail.
T. rubrum ..	20	10	8	2	—
C. albicans ..	10	1	7	—	2
T. mentagrophytes	2	2	—	—	—
E. floccosum ..	1	—	1	—	—
Total ..	33	13	16	2	2

Tinea Versicolor.

Skin scrapings were obtained from lesions of the trunk of four patients with a clinical diagnosis of tinea versicolor and from the face of a fifth. On microscopic examination the typical spores and short hyphæ were seen in skin scrapings from the trunk of one patient, and short hyphæ only in the scrapings from trunk lesions of two others. Cultures prepared from these two latter for confirmatory reasons gave negative findings.

DISCUSSION.

The importance of an accurate mycological diagnosis from the point of view of prognosis, treatment and prevention of spread of the infection can hardly be overemphasized; the diagnosis can seldom be made on purely clinical grounds.

It was found that 4% of skin infections seen by dermatologists in Melbourne were due to fungi. From 404 patients suffering from skin, hair or nail infections diagnosed clinically as possibly mycotic, 163 positive cultures were obtained. It was found that cultural methods increased the proportion of proven cases of fungous infection; 73 specimens which gave negative results on microscopic examination yielded positive cultural results. However, 38 specimens which gave positive

microscopic results yielded negative results on culture. With the addition of cultures received for identification, it was found that *T. rubrum* was the most frequently isolated organism, followed closely by *M. canis*.

The commonest cause of ringworm of the head was *M. canis*, and in many cases there was evidence that the infection had been contracted from domestic pets.

Under experimental conditions the organism was shown to remain viable in hair for a period of at least eight months, and this persistence may be of epidemiological importance.

T. sulphureum was next in frequency. Its source was unknown. Mancy (1952) reported three cases. *T. tonsurans* has been reported in Sydney (Durie and Brown, 1953) and in Adelaide (Donald, 1959), but was not encountered in this series.

M. audouini (dysgonic type) has been reported previously by Mancy (1952). The eugonic variety of this organism has not been reported in Melbourne. The five dysgonic cultures in the present series were isolated from a single localized outbreak among children in a mental institution.

One culture received for identification proved to be *T. schoenleini*. Nutritional tests were used for identification. It was capable of growing on casein vitamin-free agar. This is the first time this organism has been reported in Australia. Two cultures of *T. verrucosum* were received. One had a nutritional requirement for thiamin, and not for thiamin and inositol, as is most common. Another culture received for identification was *T. violaceum*. It was isolated from the hairs of an aboriginal boy. This organism has been reported only once previously in Melbourne, at St. Vincent's Hospital (Christie, personal communication). It is not uncommon in Adelaide (Donald, 1959).

Hairs infected with *M. canis* and *M. audouini* (dysgonic type) readily fluoresce under the Wood's lamp, but those infected with *T. sulphureum*, *T. verrucosum* or *T. violaceum* do not. Those infected with *T. schoenleini* give weak fluorescence only. These facts should be borne in mind by the clinician, as in these cases diagnosis and confirmation of cure depend on accurate microscopic and cultural examination of hairs.

Only one case of beard infection was seen. *T. rubrum* was isolated.

The most common cause of ringworm of the body was *M. canis*. Once again, there was a high incidence of infection from domestic animals. *T. verrucosum* was next in frequency. In five of the six cases there was a history of contact with cattle. *T. rubrum* and *T. mentagrophytes* were each isolated twice. Not included in this survey are seven cases of tinea corporis due to *T. mentagrophytes* contracted by laboratory workers handling infected mice and guinea-pigs. *E. floccosum*, *T. sulphureum* and *T. violaceum* were each isolated once. The two last-mentioned infections were in contacts of children with tinea capitis due to the same organisms.

The most commonly isolated fungus from feet was *T. rubrum* (41%) followed by *T. mentagrophytes* (36%). Mancy (1952) found *T. mentagrophytes* was the more frequent (*T. mentagrophytes* 61%, *T. rubrum* 18%). This change in incidence may be due to the gradual spread of infections acquired by men serving in tropical areas during the last war. A similar change appears to have occurred in England (Riddell and Stewart, 1958). However, Götz (1959) has suggested the possibility of mutation of *T. mentagrophytes* to *T. rubrum*.

In more than half the patients infected with *T. rubrum*, some area other than the interdigital clefts of the feet was involved. The infection spread widely to the toe-nails, finger-nails and hands, and all over the soles of the feet. On the skin *T. rubrum* presented a mild, extensive infection, hardly noticeable until scraped with a blunt scalpel. *E. floccosum* was isolated occasionally and *M. canis* and *C. albicans* were found infrequently.

T. rubrum was also the most commonly isolated fungus from nails. All stages were seen, ranging from discoloration to complete heaping-up and destruction of the nails. In more than half the cases the organism was also isolated from skin scrapings. *C. albicans* was next in frequency; it was isolated most often from the finger-nails. The isolation once of *E. floccosum* and twice of *T. mentagrophytes* from nails is unusual. It would appear that with the increased frequency of *T. rubrum* there has been an increase in nail infections. Mancy (1952) reported one case only.

From the few specimens obtained from groin infections, *E. floccosum* was isolated most frequently. *C. albicans* was isolated once.

C. albicans was also isolated in cases of vulvo-vaginitis, perianal candidiasis, perlèche and paronychia.

Only one definite case of each of tinea versicolor and trichomycosis axillaris was found, and none of erythrasma.

SUMMARY.

Two surveys, one of the incidence and the other of the type distribution of fungal infection found in Melbourne, have been conducted.

The results of microscopic and cultural examinations of specimens of hair, skin and nails have been noted. Cultural examination increased the number of proven cases of fungous infection. *T. rubrum* was the most frequently isolated organism.

Species of fungi isolated from different clinical conditions have been listed. *M. canis* was most commonly isolated from the head and body, *T. rubrum* from the feet and nails, *E. floccosum* from the groin and *C. albicans* from mucous membranes. Hair infections with the resistant organism *M. audouini* (dysgonic type), *T. schoenleini*, *T. violaceum*, *T. verrucosum* and *T. sulphureum* were also encountered. Several cases of "cattle ringworm" due to *T. verrucosum* were seen. Nutritional tests were used to distinguish between cultures of *T. schoenleini* and *T. verrucosum*.

The rise in the incidence of infections due to *T. rubrum* is discussed.

The failure of the Wood's lamp as a tool for diagnosing endothrix tinea capitis and the necessity for accurate mycological examination, are emphasized.

ACKNOWLEDGEMENTS.

This work was carried out in the Bacteriology Department and Public Health Laboratory of the University of Melbourne. The writer would like to thank Professor S. D. Rubbo, Dr. M. M. Wilson and Dr. Joan Gardner of this department for their valuable help. The work was aided by a grant from Sigma Co. Ltd., which is gratefully acknowledged.

The identification of the "dysgonic" form of *M. audouini* and one culture of *T. verrucosum* were confirmed by Dr. Jacqueline Walker of the Mycological Reference Laboratory at the London School of Hygiene and Tropical Medicine. The writer's thanks are also due to Dr. Lucille K. Georg, of the Mycology Unit, Department of Health, Education and Welfare, Chamblee, Georgia, for her repetition of nutritional tests on four strains of *T. verrucosum* and one of *T. schoenleini*. Her comments and photographs were of great assistance. Dr. E. S. Mancy provided information on the incidence of fungal infections in Melbourne, and to this end Dr. I. O. Stahle and Dr. R. Kelly permitted the collection of material from their patients.

Included in this survey are cultures received for identification from various sources. In particular, the following uncommon species were received from Dr. R. Kelly, Royal Children's Hospital, Melbourne, which had been isolated by Mrs. Rosemary Davidson: *T. schoenleini*, one; *T. verrucosum*, two; *T. violaceum*, two; *T. sulphureum*, two; *M. audouini*, dysgonic type, five. Cultures were also received from St. Vincent's Hospital, the Queen Victoria Hospital, Prince Henry's Hospital and the Repatriation General Hospital, Heidelberg.

REFERENCES.

AJELLO, L., and GEORG, L. (1957), "In Vitro Hair Cultures for Differentiating Between Atypical Isolates of Trichophyton Mentagrophytes and Trichophyton Rubrum", *Mycopathologia (Denhaag)*, 8:3.

CHRISTIE, R., and MORTON, M. M. (1953), "The Detection of Candida Albicans", *Aust. J. Derm.*, 2:87.

CHRISTIE, R. (1959), personal communication.

DONALD, G. F. (1959), "A Warning on the Frequency of Endothrix Tinea Capitis among the Aboriginal and Part-Aboriginal Population of South Australia", MED. J. AUST., 2:435.

DURIE, E. B., and BROWN, S. (1953), "Fungus Infections in Hospital Practice", MED. J. AUST., 2:813.

ENGLISH, M. (1958), "Epidemiology of Trichophyton Rubrum Infection", in Riddell, R. W., and Stewart, G. T., *loco citato*.

GEORG, L. K., and CAMP, LA V. B. (1957), "Routine Nutritional Tests for the Identification of Dermatophytes", *J. Bact.*, 74:113.

GEORG, L. K. (1959), personal communication.

GÖTZ, H. (1959), "*Relaciones entre el Trichophyton mentagrophytes y el Trichophyton rubrum*", *Dermatologia (Méx.)*, 3:17.

HAZEN, E. L., and REED, F. C. (1955), "Laboratory Identification of Pathogenic Fungi Simplified", Thomas, Springfield, Illinois: 100.

MANCY, E. S. (1952), "Superficial Fungus Infection in Victoria", MED. J. AUST., 1:883.

MANCY, E. S. (1959), personal communication.

MORTON, M. M. (1955), "A Note on the Detection of Candida Albicans", *Aust. J. Derm.*, 3:13.

RIDDELL, R. W., and STEWART, G. T. (1958), "Fungus Diseases and their Treatment", Butterworth, London: 63.

SMITH, G. (1954), "An Introduction to Industrial Mycology", Fourth Edition, Edward Arnold, London: 249.

WALKER, J. (1950), "Variation in Microsporum Canis and Microsporum Audouini", *Brit. J. Dermat.*, 62:395.

SOME ASPECTS OF DRUG RESISTANCE IN TUBERCULOSIS AND ITS TREATMENT.

By S. GILLIS, M.D.,

Medical Superintendent and Physician, Morris Hospital, Adelaide.

RECENT figures show tuberculosis to be still the most important infectious disease in Australia, with approximately 4000 new cases annually. An incalculable difference to its prognosis has been made in the last ten years by the use of streptomycin, para-aminosalicylic acid and isoniazid; but we are now faced with the major problems in treatment presented by patients who are infected with tubercle bacilli resistant to these three drugs. Such resistance may occur in patients who have had varying periods of chemotherapy already (this I shall refer to as secondary resistance), or in previously untreated patients (primary resistance).

In view of the emergence of primary resistance, surveys have been made within the last four years, both in the United Kingdom and in the United States, of the prevalence of such initially drug-resistant infection. Of nearly 1000 cultures from a random selection of new cases in 1955-1956, Fox *et alii* (1957) found 2·3% to be resistant to streptomycin, 2·2% to PAS and 0·7% to isoniazid. In the United States, 5% of cultures were found resistant in some degree to streptomycin, 8% to PAS and 6% to isoniazid. Absolute resistance to one or more of the three drugs was seen in a total of 4% of cases (Cummings *et alii*, 1958).

Secondary resistance occurs in a larger group of patients in hospitals. Some have survived from a period before effective or adequate antituberculous chemotherapy was used or available. Others are readmitted to hospital, having themselves been responsible for interruptions in their chemotherapy both inside and outside hospital. Even when adequate combined chemotherapy is given, resistance may still occur, particularly in initially bilateral lesions with extensive cavitation, as has been confirmed by Dye (1957) in an analysis of this type of case.

That resistant infections account for a substantial proportion of hospital admissions in both England and Australia is illustrated by figures from two typical hospitals which treat tuberculous patients. They are not otherwise comparable, since one caters to a large extent for the more difficult therapeutic problems, owing to the greater emphasis on domiciliary treatment in straightforward cases, and the other is a hospital to which both straightforward and difficult treatment patients are admitted.

When such cases account for more than one in 10 of all admissions, they constitute an important group in any country, and more particularly in those Asian countries in which the incidence of tuberculosis is so much higher than it is here. Therefore it is necessary, and it is the purpose of this article, to attempt to evaluate the therapeutic regimes possible with the newer drugs now available, and to assess from the public-health point of view the role of isoniazid-resistant organisms.

RESISTANCE IN PATIENTS ADMITTED TO HOSPITAL.

One hundred and fifty-seven patients were admitted to my male tuberculosis ward at Clare Hall Hospital, London, between March, 1956, and the end of 1958 (Table I). Of these, 25 (16%) were completely resistant to streptomycin, PAS or isoniazid, or to more than one of these drugs. Of all those admitted, 45% were relapse patients, having been treated before in hospital; correspondingly, four-fifths of the resistant infections were examples of secondary resistance.

At the Morris Hospital, Adelaide (Table II), 440 patients were admitted between March, 1956, and June, 1959. Of these, 48 (11%) had infections completely resistant to one or more of the three drugs, primary and secondary resistance being present in equal numbers.

The next five tables (Tables III to VII) give a more detailed analysis of the Morris Hospital cases in relation to differences in sex, multiplicity of drug resistance, prognosis and catalase activity between primarily and secondarily resistant lesions. In these cases, resistance was shown to the highest concentration of one or more of the drugs (streptomycin 100 μg. per millilitre; PAS 100 μg. per millilitre; isoniazid 5 μg. per millilitre).

Tables III and IV show no material sex difference in the total proportion of resistant infections or between primary and secondary resistance.

It is in resistance to a multiplicity of drugs and in the prognosis that the most marked difference between primary and secondary resistance is seen. In only seven of the cases of primary resistance was the infection resistant to two or more drugs, as opposed to 18 of the cases of secondary resistance (Table V). Primary resistance is mainly to streptomycin, secondary resistance to isoniazid and streptomycin. In all resistant cases the prognosis is poor (Table VI); of the 48 patients, 10 died, and 14 were still excreting tubercle bacilli on their discharge or were still in hospital.

Of those who were not excreting tubercle bacilli on their discharge from hospital, however, three times as many had primarily resistant infections. Thus, while primary resistance obviously means a worse outlook than that for cases in which the tubercle bacilli are sensitive to streptomycin, PAS and isoniazid, secondary resistance carries with it a far gloomier implication.

The results of catalase tests were known in 22 of the cases of isoniazid resistance (Table VII). In the secondary group, of the patients who died, who were still in hospital or who were still excreting tubercle bacilli on their discharge from hospital, 10 had catalase-negative cultures. Of the patients with primarily resistant lesions, the two who died had catalase-positive cultures.

Primary Resistance.

These figures show the existence of a significant number of resistant infections among previously untreated patients, and suggest that the prevalence in Australia may be of the same order as it is in the United States and in England. The significance of primary resistance in the treatment of the patient lies in the fact that the majority, at the present time, have resistance to one drug alone, so that combinations of streptomycin or isoniazid with

PAS can still be given effectively; but this emphasizes the importance of administering all three drugs initially in treatment, until the results of sensitivity tests are known.

For the future, there is the problem of the possibility of an association of drug-resistance with diminution of pathogenicity. Strains resistant to streptomycin or PAS have unchanged virulence; but as far as isoniazid is concerned, this is not necessarily the case, and the implications of isoniazid resistance are of considerable importance both for the individual and for the community.

TABLE I.
Clare Hall Hospital.

Table Ia.
Male Tuberculosis Ward.

Year.	Patients Admitted.	Number of Resistant Infections.	Primary Resistance.	Secondary Resistance.
1956	46	7	1	6
1957	69	7	2	5
1958	42	11	2	9
Totals ..	157	25	5	20

Table Ib.
Resistant Infections as Percentage of All Admissions.

Year.	All Resistant Infections.	Primary Resistance.	Secondary Resistance.
1956	15	2	13
1957	10	3	7
1958	26	5	21
Totals ..	16	3·2	12·8

[1] Bacilli resistant to streptomycin (100 µg. per millilitre) and/or PAS (100 µg. per millilitre) and/or isoniazid (5 µg. per millilitre).

Isoniazid Resistance.

Public Health and Treatment Aspects.

There are two types of isoniazid-resistant tubercle bacilli, differentiated by their ability to synthesize an enzyme catalase, which decomposes hydrogen peroxide. Catalase-positive mutants are selected from large bacterial populations by low concentrations of isoniazid. Once selected, strains are produced by multiple steps which have higher resistance and still possess some catalase activity. Catalase-negative mutants are one-step mutants, which can be isolated from a single subculture, and which are natively resistant to much higher concentrations of isoniazid, and it is with these bacilli that diminution of pathogenicity may be associated.

They are not avirulent as is B.C.G., and cause tuberculosis in mice; but in guinea-pigs, after the first one or two months, lesions regress at a variable rate, although resolution is usually complete at six to eight months. It is important to remember, as Rist (1956) has pointed out, that the initial visceral lesions are often conspicuous, and that it may be difficult to decide between four and seven weeks (a time when the animals are often killed for diagnostic purposes whether these lesions will regress or extend. Regression, although usual, is not invariable or always complete. Miliary tuberculosis may occur at three months, and after six months lesions may persist in one organ and, rarely, pulmonary cavities occur.

In human tuberculosis, the points at issue are the infectivity of the patient who excretes isoniazid-resistant bacilli, and his own individual prognosis.

Bacilli from such a patient may be catalase-negative or catalase-positive. If isoniazid-resistant bacilli are catalase-negative, they may still cause progressive human infection because of the presence at the same time of a small number of virulent sensitive bacilli, masked by the in-vitro sensitivity tests, or because spontaneous back-mutation to virulent and sensitive bacilli may occur in the infected person, or because the particular catalase-negative strain transmitted may itself be a strain with a low degree of attenuation of pathogenicity. Isoniazid-resistant catalase-positive bacilli still retain their virulence; but, in the experience of Wolinsky (1956), most strains isolated which are resistant to 5 µg. of isoniazid per millilitre are catalase-negative (82%) and are markedly attenuated for guinea-pigs.

TABLE II.
Morris Hospital.

Table IIa.

Year.	Patients Admitted.	Number of Resistant Infections.	Primary Infections.	Secondary Infections.
1956	108	5	1	4
1957	118	17	12	5
1958	132	16	8	8
1959	82	10	3	7
Totals ..	440	48	24	24

Table IIb.
Resistant Infections as Percentage of All Admissions.[1]

Year.	All Resistant Infections.	Primary Resistance.	Secondary Resistance.
1956	5	1	4
1957	14	10	4
1958	12	6	6
1959	12	4	8
Totals ..	11	5·5	5·5

[1] Bacilli resistant to streptomycin (100 µg. per millilitre) and/or PAS (100 µg. per millilitre) and/or isoniazid (5 µg. per millilitre).

At the Morris Hospital, in cases of secondary resistance (to 5 µg. of isoniazid per millilitre), 10 infections were catalase-negative and seven catalase-positive. Of the 24 primarily resistant infections, only nine showed isoniazid resistance, and in only one were the bacilli found to be catalase-negative (Table VII).

Debré *et alii* (1959), in children with primary tuberculosis, found 4·6% of strains primarily resistant to streptomycin, and four of 168 resistant to isoniazid, but all four were catalase-positive.

While there is no guarantee, for the person infected from a patient excreting isoniazid-resistant bacilli, that infection may not occur for the reason already given, nevertheless for the community the implications are of fundamental importance.

If isoniazid-resistant catalase-negative bacilli cause infection in human beings, as in guinea-pigs, which is regressive in most instances and overcome by natural immunity, then appropriate treatment of tuberculous patients can materially reduce the reservoir of virulent tubercle bacilli in the community by replacement with these attenuated bacilli. The application is crucial in those countries where the incidence of tuberculosis is very many times higher than it is in Australia. Where medical and nursing facilities are such that streptomycin cannot be given to most sufferers and the taking of PAS

will be neglected because of intolerance, isoniazid alone in treatment, although of limited value for the individual patient, may be of as much value in the tuberculosis campaign as B.C.G. vaccination programmes.

To prevent the emergence of the virulent isoniazid-resistant catalase-positive mutants, it is necessary that isonazid should be given in sufficient dosage — not less than 8 mg. per kilogram. As Middlebrook (1954) has pointed out, once these strains have appeared it is difficult to cause their disappearance by subsequent increase of the daily dosage to this amount. The rate of metabolic inactivation of isoniazid is important in this connexion. Mandel *et alii* (1957) found that when isoniazid was given in dosage of 3 to 5 mg. per kilogram, the patients whose bacilli became isoniazid-resistant and were catalase-negative had achieved, in most cases, a serum isoniazid concentration of 1·6 μg. per millilitre six hours after a dose of 4 mg. per kilogram, whereas when bacilli were resistant and catalase-positive, the serum concentration was usually under 0·4 μg. Part of the action of PAS may be due to the fact that it inhibits the acetylation of isoniazid by a competitive mechanism with resultant increase in blood levels of free isoniazid (Mandel *et alii*, 1956). So-called rapid isoniazid inactivators have a serum level of 0·2 μg. or less six hours after the test dose, whereas slow inactivators have a level of 0·8 μg. or more, and it is significant therapeutically that there may be genetic differences in the proportion of rapid inactivators. For example, in one investigation 22 of 25 subjects of Japanese descent fell into this category, whereas only 12 of 25 subjects of European origin did so (Harris *et alii*, 1958).

The metabolic pattern of isoniazid varies greatly from individual to individual, but is constant in the same person and unaffected by age, six or the extent of the disease.

These findings indicate the advisability of estimating isoniazid blood levels when facilities are available, so that dosage can be adjusted to reach the best therapeutic effect with the least toxicity. The method mainly used is microbioassay, which needs a rather elaborate laboratory set-up and a lapse of ten days for results; but Peters (1959) has recently described a chemical procedure in which, after extraction, isoniazid produces with cyanogen bromide a reaction product, the fluorescence of which is proportional to free isoniazid concentration and can be measured fluorometrically. Where no such facilities exist, it will be necessary to keep in mind the possibility of rapid isoniazid inactivation as a cause of lack of progress.

Secondary Resistance.

Of the 24 patients at the Morris Hospital with secondary resistance, all except one showed resistance to isoniazid. The 10 cases in which cultures were found to be catalase-negative had no better prognosis than the seven in which catalase-positive isoniazid-resistant cultures were present (Table VII).

I have noticed, as have other observers (Oestreicher *et alii*, 1955) new X-ray shadows appear with constitutional upset in some isoniazid-resistant patients maintained on isoniazid, and regression occur almost as rapidly as it does in patients receiving drugs to which the bacilli are sensitive. This implies that even in such patients with extensive cavitary tuberculosis and secondary resistance, these bacilli are limited in their ability to produce fresh foci of disease either in the lungs or in other organs.

Nevertheless, the clinical course will depend on other factors — the extent of cavitation produced before the attenuated strains appear, the general condition of the patient and the limitation of lung function already present. The attenuated bacilli continue to multiply in open cavities and cause toxic effects thereby. The new lesions, although they regress, must cause each time some further fibrosis and further diminution of respiratory reserve. In addition, the bacterial population in a patient with isoniazid-resistance is not necessarily homogeneous, as Tompsett (1954), Stewart (1956) and Schweiger and Vandra (1958) have pointed out. Small numbers of isoniazid-sensitive strains or of strains with a lower degree of resistance may still be present, and in the absence of further isoniazid administration such strains may increase and themselves be responsible for clinical progression.

These points emphasize the importance of adequate isoniazid dosage *ab initio*, to encourage the production of a more homogeneous catalase-negative resistant bacterial population, should the patient continue to excrete the

TABLE III.
Morris Hospital.

Table IIIA.
Males.

Year.	Patients Admitted.	Number of Resistant Infections.	Primary Resistance	Secondary Resistance.
1956	62	2	0	2
1957	75	12	9	3
1958	96	11	5	6
1959	58	8	2	6
Totals ..	291	33	16	17

Table IIIB.
Resistant Infections as Percentage of All Admissions.

Year.	All Resistant Infections.	Primary Resistance.	Secondary Resistance.
1956	3	—	3
1957	16	12	4
1958	11	5	6
1959	14	3·5	10·5
Totals ..	11	5·4	5·6

TABLE IV.
Morris Hospital.

Table IVA.
Females.

Year.	Patients Admitted.	Number of Resistant Infections.	Primary Resistance.	Secondary Resistance.
1956	46	3	1	2
1957	43	5	3	2
1958	36	5	3	2
1959	24	2	1	1
Totals ..	149	15	8	7

Table IVB.
Resistant Infections as Percentage of All Admissions.

Year.	All Resistant Infections.	Primary Resistance.	Secondary Resistance.
1956	6	2	4
1957	11·5	7	4·5
1958	14	8	6
1959	8	4	4
Totals ..	10	5·3	4·7

bacilli, not only to prevent dissemination of the more virulent catalase-positive resistant strains to other persons, but also to limit the spread of his own disease. It is desirable also to maintain isoniazid therapy despite resistance, to prevent multiplication of any sensitive bacilli remaining, to prevent back mutation and, if possible (although this is unlikely) to prevent the growth of any catalase-positive partially-resistant strains present which are still sensitive to the higher isoniazid concentrations.

At the present time, many of these patients with catalase-negative bacilli have extensive disease which will inevitably progress despite bacillary attenuation, and therefore an attempt must be made to render them bacteriologically "negative" with the help of more recent drugs, to which they may be sensitive. Those who have limited disease may have been treated in the past with the lower isoniazid dosage, which used to be the routine, and therefore may be excreting resistant bacilli which are either catalase-positive or non-homogeneous strains only apparently catalase-negative.

Very high isoniazid dosage (10 to 20 mg. per kilogram) has been under trial in the United States. However, the good results in one study (Organick *et alii*, 1959) appear to have been associated with retention of sensitivity to streptomycin in some cases and of sensitivity to PAS in all cases. This approach nevertheless merits further investigation, in combination with the use of the newer drugs.

TABLE V.
Multiple Drug Resistance.

Table Va.
Primary Resistance.

Year.	All Cases.	One Drug.	Two Drugs.	Three Drugs.	SM.[1]	PAS.	INH.
1956 ..	1	1	—	—	1	—	—
1957 ..	12	9	1	2	8	3	6
1958 ..	8	5	3	—	6	3	2
1959 ..	3	2	1	—	3	—	1
Totals	24	17	5	2	18	6	9

[1] Streptomycin.

Table Vb.
Secondary Resistance.

Year.	All Cases.	One Drug.	Two Drugs.	Three Drugs.	SM.[1]	PAS.	INH.
1956 ..	4	2	1	1	2	1	4
1957 ..	5	—	—	5	5	5	5
1958 ..	8	2	4	2	5	3	8
1959 ..	7	2	4	1	5	2	6
Totals	24	6	9	9	17	11	23

[1] Streptomycin.

GENERAL CONSIDERATIONS OF NEW ANTITUBERCULOUS DRUGS.

All the new antituberculous drugs are more toxic than streptomycin, PAS or isoniazid, and at the present time those with the higher therapeutic activity are the most toxic, while those that are relatively free from side effects have a feebler action. In newly diagnosed cases, in combination with one of the three original drugs, most of the new drugs are quite effective as supportive treatment and in delaying the emergence of resistant strains. In chronic infections with resistance to streptomycin, PAS and isoniazid, their value is in general limited; but they can render patients fit to undergo surgery, and themselves provide definitive treatment for a small number.

Preliminary sensitivity tests are necessary, and the possibility of cross resistance — for example, between viomycin and kanamycin — and of a high degree of initial resistance, as may occur with cycloserine, must be borne in mind. In-vitro pyrazinamide sensitivity tests may be no guide to in-vivo activity. When therapeutic and toxic dosages are close, as with cycloserine, blood-level estimations are desirable.

There may be toxic effects on the liver, as with pyrazinamide or the thiosemicarbazones, or on the kidneys, as with kanamycin or viomycin. Cycloserine has psychiatric and convulsive side effects which appear to be potentiated if isoniazid is given at the same time, and which have some relation to pyridoxine metabolism. The auditory division of the eighth nerve may be affected by kanamycin or viomycin. Serial liver or renal function tests or audiometric examinations may accordingly be indicated. In recent efforts with otherwise untreatable patients, the dosage of cycloserine has been increased with anticipation of toxicity and its control by additional medication.

TABLE VI.
Prognosis.

Table VIa.
Primary Resistance.

Year.	Number of Patients.	"Negative" on Discharge.	"Positive" on Discharge.	"Positive"; Still in Hospital.	Died.
1956	1	1	—	—	—
1957	12	10	1	—	1
1958	8	4	3	—	1
1959	3	3	—	—	—
Total ..	24	18	4	—	2

Table VIb.
Secondary Resistance.

Year.	Number of Patients.	"Negative" on Discharge.	"Positive" on Discharge.	"Positive"; Still in Hospital.	Died.
1956	4	3	—	—	1
1957	5	—	1	1	3
1958	8	1	1	2	4
1959	7	2	2	3	—
Total ..	24	6	4	6	8

In most cases, combination therapy is essential to delay the emergence of strains resistant to these drugs as well, although cycloserine in high dosage has been given alone for a time, a second drug being introduced to cover the operative period. If possible, it is important in such a combination to avoid administering two drugs which have similar toxic effects.

With different combinations of these drugs, there are variations in the results to be anticipated, and in addition, in individual cases, there are definite limits to the use and duration of administration of a particular drug.

Pyrazinamide has a unique mode of action, and in combination with isoniazid probably represents the most powerful antituberculous chemotherapeutic agent at present available. In experimental animals the effect is remarkable, in that total eradication of tubercle bacilli occurs—and in a short time (McDermott *et alii*, 1954). In man, apart from toxic effects, the results are probably better than with PAS and isoniazid, with rapid sustained disappearance of bacilli from the sputum in many cases.

In vitro, pyrazinamide exhibits little activity against virulent strains (Tarshis and Weed, 1953) except in an acid medium (Tompsett *et alii*, 1956), but has a very powerful action on strains resistant to between 5 and 15 μg. of isoniazid per millilitre (Perry and Morse, 1955), and this may explain the effect of its combination with isoniazid *in vivo*. Used with cycloserine or viomycin, it is valuable as a preparation for surgery, and on a long-term basis sputum conversion has been achieved in up to 25% of cases in different series.

The hepatic toxicity of pyrazinamide has prohibited more widespread administration of this valuable drug, although it is possible that its maximum benefit is achieved in a comparatively short period. Toxic hepatitis has occurred in 4·4% of cases, with occasional death from acute hepatic necrosis (Morrisey and Rubin, 1958). Liver function tests, prior to treatment and weekly during treatment, are essential. The most useful, in my experience, is estimation of serum transaminase levels, together with the bromsulphalein excretion test and one of the flocculation tests. A high result in one of these will indicate that treatment with pyrazinamide should be discontinued.

TABLE VII.
Isoniazid Resistance and Catalase Activity.

Table VIIA.
Primary Resistance.

Isoniazid Resistance and Catalase Activity.	"Negative" on Discharge.	"Positive" on Discharge.	"Positive"; Still in Hospital.	Died.
Isoniazid-sensitive[1]	11	4	—	—
Isoniazid-resistant	7	—	—	2
Catalase-positive	2	—	—	2
Catalase-negative	1	—	—	—
Catalase activity not known	4	—	—	—

Table VIIB.
Secondary Resistance.

Resistance and Catalase Activity.	"Negative" on Discharge.	"Positive" on Discharge.	"Positive"; Still in Hospital.	Died.
Isoniazid-sensitive[1]	1	—	—	—
Isoniazid-resistant	5	4	6	8
Catalase-positive	1	2	—	4
Catalase-negative	—	1	5	4
Catalase activity not known	4	1	1	—

[1] Streptomycin or PAS resistant.

Hyperuricæmia is frequent and has to be dealt with by concurrent administration of "Probenecid" or some other uricosuric agent.

The therapeutic level of cycloserine lies within a narrow range. Below it, enhancement of bacterial growth may occur (Reiss and Townsend, 1959); above it, the toxic effects of tremors, depression, psychotic disturbances and convulsions are common. When other treatment has failed, cycloserine and viomycin may produce some radiographic clearing, but there is little effect on cavitation. In advanced infections, resistant to most other drugs, cycloserine in high dosage (1·5 to 2·0 grammes or more daily) has been given recently, toxic effects being controlled, in most cases, with pyridoxine, anticonvulsants or tranquillizers. In one series nearly half the infections were rendered inactive, the majority of the patients having become fit for surgery (Pyle *et alii*, 1959).

In determining the optimum therapeutic dosage, blood levels have to be estimated, and the difficulty may arise (as I have found in patients with resistance to streptomycin, PAS and isoniazid, who have yet not received cycloserine) of an initial cycloserine resistance to as much as 20 μg. per millilitre (Reiss and Townsend, 1959). For serum levels to exceed this, it is necessary for the dosage to exceed the recommended therapeutic dosage of 0·5 to 0·75 gramme per day. In view of this, the toxic effects of high cycloserine dosage — particularly the psychiatric effects, in which personality changes or frank psychosis may occur — although usually reversible after cessation of therapy, have to be weighed against the gravity of the prognosis of tuberculosis in such patients.

Kanamycin has been reported from Japan to be as effective as streptomycin. Wright *et alii* (1959) found some antituberculous activity in its use in 12 cases and few toxic effects in a dosage of 0·5 gramme per day. The therapeutic dosage lies between 4 and 6 grammes per week. Above 6 grammes, there is an appreciable risk of nerve deafness and possible renal damage; below 4 grammes, the value of the drug is much diminished. An intermittent régime may therefore be the most convenient, as with viomycin (2 grammes twice a week). Nerve deafness first occurs at the higher frequencies, and may progress after treatment is stopped. During treatment, serial audiographic and urine examinations and urea clearance tests are therefore important.

So far, my own experience of this drug is that, while it has a definite effect in the alleviation of toxæmia, this is not dramatic, and its permanent value in these almost totally resistant advanced infections remains to be seen.

Viomycin has been in use since 1950. It has appreciable renal and auditory toxicity, so that dosage has to be reduced to a point at which its moderate therapeutic value is even further diminished. It has a useful ancillary effect when given with one of the three major drugs. However, when it is used in combination with pyrazinamide, good results occur in barely one-fifth of the cases (Tucker, 1954).

Thiocetazone (TB1), the isocyclic *p*-acetylaminobenzaldehyde thiosemicarbazone, was demonstrated by Domagk in 1946 to have antituberculous activity. The heterocyclic nicotinaldehyde thiosemicarbazone was investigated in 1954. In combination with isoniazid, it can delay the development of isoniazid resistance when patients are intolerant of or resistant to PAS and streptomycin, although one-third of patients may become isoniazid resistant after six months (Cuthbert *et alii*, 1958). In itself it is only a weak anti-tuberculous agent, and although it is relatively slightly toxic compared with TB1, liver function tests are advisable.

"Hincostarch", a mixed polymer prepared by condensation of starch with a thiosemicarbazone and isoniazid, is effective, when there is isoniazid sensitivity, but liver damage may occur. It is doubtful whether it has any advantage over isoniazid alone.

While oxytetracycline does not delay the onset of pyrazinamide resistance or enhance its effectivity (Stewart *et alii*, 1957), nevertheless it is a useful drug in combination with viomycin in a dosage of not less than 4 grammes per day (Murdoch and Stewart, 1956; Pines, 1957) in delaying emergence of resistance, and it has sufficient tuberculostatic effect to enable surgery to be carried out in a number of otherwise hopeless cases. The risk of staphylococcal enteritis must be borne in mind; but other side effects and intolerance at this dosage can be obviated to some extent by concurrent administration of nystatin (Larkin, 1959).

Various other drugs have been under investigation recently, but have not proved as useful as was hoped. These include thiocarbanidin (Hodgkinson, 1959), streptovaricin (Johnson, 1959) and verazide (Rubbo *et alii*, 1958). Neomycin aerosols and alpha-ethyl-thioisonicotinamide (Brouet *et alii*, 1959) are among others that are under trial at the present time.

I shall not deal with corticosteroids in this communication, as they do not constitute chemotherapy as such. They have, of course, a definite place in the treatment of drug-sensitive tuberculosis when adequate chemotherapeutic cover can be given at the same time. In resistant infections, when chemotherapy is limited, the possibility of dissemination under steroid therapy, inadequately covered by less powerful antituberculous

drugs, has to be weighed against possible relief of toxic effects with no effect on the chronic disease itself.

CONCLUSION.

There is, therefore, a choice between different chemotherapeutic régimes in chronic cases. Decision is based on a number of factors. Of importance are the extent and degree of retention of sensitivity to streptomycin, PAS or isoniazid, the extent of disease and ultimate possibility of surgery, the need to continue isoniazid therapy whenever possible, and the presence of alcoholism and other diseases.

If there is isoniazid sensitivity with resistance to streptomycin and PAS, most of the other drugs will delay or prevent emergence of strains resistant to isoniazid and potentiate its therapeutic effect, although care is necessary with cycloserine and isoniazid in combination, as an increase of cycloserine toxicity may occur. Even when only limited sensitivity to isoniazid is left, pyrazinamide is worth a trial for a short period, with due precautions, in view of its special action on such partially isoniazid resistant strains, although much success cannot be anticipated in advanced cases. Similarly, when the bacilli remain sensitive to streptomycin the newer drugs can be given in support, although there may be additive toxicity to the auditory division of the eighth nerve if either kanamycin or viomycin is administered with dihydrostreptomycin.

Hepatic disease creates difficulties in treatment with any chemotherapy and will prohibit pyrazinamide and possibly the thiosemicarbazones, while viomycin and kanamycin have to be used with particular caution in the presence of renal disease. Cycloserine may aggravate existing personality and psychiatric disorders and render latent tendencies overt. When a patient with a resistant infection is an alcoholic, problems may arise because of the presence of cirrhosis and the greater possibility of a personality disorder.

For results to be gained with these drugs, initial and full sensitivity tests to them must be carried out in all these cases, and their administration must be controlled by repeated function studies. With such measures an often surprising degree of success can be achieved.

SUMMARY.

Patients with tuberculosis resistant to streptomycin, PAS and isoniazid form a significant proportion of admissions to chest hospitals in England and Australia.

The extent of this problem and its treatment with new chemotherapeutic agents is discussed with particular reference to the role of isoniazid resistance from an individual and a public-health point of view.

REFERENCES.

BROUET, G., MARCHE, J., RIST, N., CHEVALIER, J., and LEMEUR, G. (1959), "Observations on the Antituberculous Effectiveness of Alpha Ethyl Thioisonicotinamide in Tuberculosis in Humans", *Amer. Rev. Tuberc.*, 79: 6.

CUMMINGS, M. M., and LIVINGS, D. G. (1958), "Prevalence of Streptomycin Resistant, PAS Resistant and Isoniazid Resistant Tubercle Bacilli among 3161 Veteran Patients with Untreated Tuberculosis", "Transactions of the 17th Conference of the Chemotherapy of Tuberculosis", V.A. Armed Forces: 252.

CUTHBERT, R. J., DRIMMIE, A. M. T., and URQUHART, K. R. (1958) "A Study of 'Tebafen' in Chronic Pulmonary Tuberculosis", *Tubercle*, 39: 360.

DERRÉ, R., NOUFFLARD, H., BRISSAUD, H. E., and GERBEAUX, J. (1959), "Infection of Children by Strains of Tubercle Bacilli Initially Resistant to Streptomycin or to Isoniazid", *Amer. Rev. Tuberc.*, 80: 326.

DYE, W. E. (1957), "Further Analysis of Drug Susceptibility Data", "Transactions of the 16th Conference of the Chemotherapy of Tuberculosis", V.A. Armed Forces: 83.

FOX, W., WIENER, A., MITCHISON, D. A., SELKON, J. B., and SUTHERLAND, I. (1957), "Prevalence of Drug Resistant Tubercle Bacilli in Untreated Patients with Pulmonary Tuberculosis. A National Survey 1955-6", *Tubercle*, 38: 71.

HARRIS, H. W., KNIGHT, R. A., and SELIN, M. J. (1958), "Comparison of Isoniazid Concentrations in Blood of People of Japanese and European Descent; Therapeutic and Genetic Implications", *Amer. Rev. Tuberc.*, 78: 944.

HODGKINSON, R., Department of Clinical Investigation, Parke Davis and Co., Detroit (1959), personal communication.

JOHNSON, F. T., Medical Director, Upjohn, Inc., Michigan (1959), personal communication.

LARKIN, R. (1959), "Side Effects of Tetracycline Alone and of Tetracycline with Nystatin", *Lancet*, 1: 1228.

MANDEL, W., COHN, M. L., RUSSELL, W. F., jun., and MIDDLEBROOK, G. (1956), "Effect of Para Amino Salicylic Acid in Serum Isoniazid Levels in Man", *Proc. Soc. exp. Biol. (N.Y.)*, 91: 409.

MANDEL, W., COHN, M. L., RUSSELL, W. F., and MIDDLEBROOK, G. (1957), "Serum Isoniazid Levels and Catalase Activities of Tubercle Bacilli from Isoniazid Treated Patients", *Amer. J. med. Sci.*, 233: 66.

MCDERMOTT, W., MCCUNE, R. M., jun., and TOMPSETT, R., (1954), "Pyrazinamide Isoniazid in Tuberculosis", *Amer. Rev. Tuberc.*, 69: 319.

MIDDLEBROOK, G., COHN, M. L., and SCHAEFFER, W. B., (1954), "Studies on Isoniazid and Tubercle Bacilli", *Amer. Rev. Tuberc.*, 70: 852.

MORRISSEY, J. F., and RUBIN, R. C. (1958), "Detection of Hepatic Toxicity Due to Pyrazinamide by Means of Determination of Serum Enzymes", "Transactions of the 17th Conference of the Chemotherapy of Tuberculosis", V.A. Armed Forces: 59.

MURDOCH, J. MCC., and STEWART, S. M. (1956), "Viomycin with Oxytetracycline in the Treatment of Pulmonary Tuberculosis", *Brit. J. Tuberc.*, 50: 85.

OESTEREICHER, R., DRESSLER, S. H., RUSSELL, W. F., jun., GROW, J. B., and MIDDLEBROOK, G. (1955), "Observations on the Pathogenicity of Isoniazid Resistant Mutants of Tubercle Bacilli for Tuberculous Patients", *Amer. Rev. Tuberc.*, 71: 390.

ORGANIK, A. B., and MITCHELL, R. S. (1959), "Outcome of Retreatment of Pulmonary Tuberculosis Using High Doses of Izoniazid Plus Streptomycin and PAS", "Transactions of the 18th Conference of the Chemotherapy of Tuberculosis", V.A. Armed Forces: 91.

PERRY, C. R., and MORSE, W. C. (1955), "Pyrazinamide Susceptibility of Izoniazid Resistant Mutants of Tubercle Bacilli", *Amer. Rev. Tuberc.*, 72: 840.

PETERS, J. H. (1959), "The Relationship between Plasma Concentration and Urinary Excretion of Isoniazid", "Transactions of the 18th Conference of the Chemotherapy of Tuberculosis", V.A. Armed Forces: 37.

PINES, A. (1957), "Treatment of Pulmonary Tuberculosis by Viomycin Combined with Oxytetracycline", *Tubercle*, 38: 189.

PYLE, M. M., PFUETZE, K. H., BARCLEY, W. R., and KASIK, J. E. (1959), "Cycloserine in High Dosage in Salvage Cases of Pulmonary Tuberculosis with Control of Toxicity by Concomitant Medication", "Transactions of the 18th Conference of the Chemotherapy of Tuberculosis": 128.

REISS, J., and TOWNSEND, S. M. (1959), "In Vitro Evidence of Growth Enhancement with Minimal Concentrations of Cycloserine", "Transactions of the 18th Conference of the Chemotherapy of Tuberculosis": 119.

RIST, N. (1956), "Pathogenicity of Isoniazid Resistant Tubercle Bacilli", *Amer. Rev. Tuberc.*, 74: Suppl. 75.

RUBBO, S. D., ROUCH, L. C., EGAN, J. B., WADDINGTON, A. L., and TELLESON, W. G. (1958), "Antituberculous Activity of Verazide and Related Hydrazones", *Amer. Rev. Tuberc.*, 78: 251.

SCHWEIGER, O., and VANDRA, E. (1958), "Bacteriologic and Clinical Significance of the Catalase Activity of Mycobacterium Tuberculosis", *Amer. Rev. Tuberc.*, 78: 735.

STEWART, S. M. (1956), "Varied Degrees of Isoniazid Resistance within Strains of Tubercle Bacilli from Sputum and Pulmonary Cavities", *Amer. Rev. Tuberc.*, 73: 390.

STEWART, S. M., MURDOCH, J. MCC., CROFTON, J. W., and HAY, D. (1957), "Pyrazinamide and Oxytetracycline in Patients with Tubercle Bacilli Resistant to Streptomycin, PAS and Isoniazid", *Brit. J. Tuberc.*, 51: 158.

TARSHIS, M. S., and WEED, W. A., jun. (1953), "Lack of Significant In Vitro Sensitivity of Mycobacterium Tuberculosis to Pyrazinamide", *Amer. Rev. Tuberc.*, 67: 391.

TOMPSETT, R. (1954), "Quantitative Observations on the Pattern of Emergence of Resistance to Isoniazid", *Amer. Rev. Tuberc.*, 70: 91.

TOMPSETT, R., MCCUNE, R., LEE, S. H., and MCDERMOTT, W. (1956), "Relation of PZA Resistance In Vivo to Activity of Drug in Acidic Environment In Vitro", "Transactions of the 15th Conference of the Chemotherapy of Tuberculosis", V.A. Armed Forces: 268.

TUCKER, W. (1954), "Retreatment of Advanced Pulmonary Tuberculosis with Viomycin", *Amer. Rev. Tuberc.*, 70: 812.

WOLINSKY, E., SMITH, M. M., and STEENKEN, W., jun. (1956), "Isoniazid Susceptibility, Catalase Activity and Guinea Pig Virulence of Recently Isolated Cultures of Tubercle Bacilli", *Amer. Rev. Tuberc.*, 73: 768.

WRIGHT, K. W., RENZETTI, A. D., jun., LUNN, J., and BUNN, P. A. (1959), "Observations on Administration of Kanamycin to Patients with Tuberculosis", *Amer. Rev. Tuberc.*, 79: 72.

PREANÆSTHETIC SEDATION FOR CHILDREN.

By GEOFFREY CORNISH, M.B., B.S.,

AND

DOUGLAS GALBRAITH, M.D., F.R.A.C.P.,

From the Royal Children's Hospital (Orthopædic Section), Mount Eliza, Victoria.

IT is generally accepted that a hospital is an abnormal environment for a child, and that some of the procedures used there may have harmful, and sometimes far-reaching, effects on children. Many authors have written about these problems, including Grover F. Powers (1948), James Spence (1951), Bowlby (1951) and Felix Arden (1956). One of us (D.G.), in 1957, speaking as a pædiatrician, described certain procedures used in the Royal Children's Hospital Orthopædic Section, which over the years have proved of value in this regard. Professor R. S. Illingworth (1958), in a very comprehensive and instructive talk on "Children in Hospital", said: "The use of pre-medication is a matter for further investigation."

After we had read Gusterson's paper (1955), and Robertshaw's experience (1955) with an elixir of "Oblivon" (methylpentynol) and hyoscine hydrobromide, a trial of this method was suggested. We both considered that an improvement in premedication was urgent. This was mainly because a high proportion of our patients (35%) was below school age, and most of them had undergone previous operations or had had a series of three or four operations in the orthopædic treatment planned for them.

From this it can be seen that our patients were far more experienced and far more embittered than the usual children presenting for operation in hospital. They were, therefore, particularly suspicious of any medication given after the "No nourishment" sign was placed on the bed, and it was thought that premedication satisfactory in these circumstances would indeed be well proven.

Objectives.

The objectives of the trial were as follows: (i) to provide adequate standardized preoperative sedation and to use the minimum number of drugs; (ii) to combine the sedative and the atropine analogues in one mixture or one hypodermic injection; (iii) to avoid the use of hypodermic injection in unpremedicated children aged less than 10 years or weighing less than 32 kg. (70 lb.); (iv) not only to observe the adequacy of the premedication, but also to record the memory or impression of each child relating to the anæsthetic procedure.

To implement this, a pro-forma was evolved recording the name, age and weight, premedication details, the anæsthetist's comments, and the ward sister's comments on the child's post-operative emotional state and memory of the procedures.

Preoperative Medication.

For children aged 10 years or less, Robertshaw's oral dosage of "Oblivon" combined with hyoscine was used. For children aged over 10 years and weighing more than 32 kg. (70 lb.), the combined "Omnopon"-scopolamine ampoules of Roche were used. Hyoscine and scopolamine are synonymous. The strengths of these preparations are as follows: (*a*) "Oblivon"-hyoscine hydrobromide: 4 ml. (1 teaspoon)—that is "Oblivon" 250 mg., with hyoscine 0·12 mg. (1/500 of a grain); (*b*) "Omnopon"-scopolamine: one one-millilitre ampoule—that is, "Omnopon" 20 mg. (one-third of a grain) with scopolamine 0·4 mg. (1/150 of a grain).

Dosage.

The dosage schedules were worked out as follows:

1. "Oblivon-hyoscine. (i) Below the age of 18 months, the dosage was by the doctor's individual direction—usually 4 ml. (one teaspoon). (ii) Between 18 months and four years, the dosage was 6 to 8 ml. (1·5 to 2·0 teaspoons). (iii) From four to 10 years, the dosage was 4 ml. per 6·5 kg. (14 lb.), to a maximum of 24 ml.

2. "Omnopon"-scopolamine. (i) From the ages of 10 to 12 years, and with weights of more than 32 kg. (70 lb.), the dosage was 0·5 ml. (ii) For children aged 12 years and over, the dosage was 1 ml.

All premedication timed was given not less than half an hour before the commencement of anæsthesia, and usually approximately one hour.

Preparation of Apprehensive Children.

For particularly nervous or apprehensive children, preliminary sedation was used on the day before operation, or in the morning if operation was planned for the afternoon, with "Oblivon C", 100 mg. "ovets" (the long-acting "Oblivon").

Type of Anæsthesia.

The type of anæsthesia varied with the age of the child and the requirements of the surgeon. Nearly all children were given a "sleep dose" of "Pentothal" (5%) solution. The usual practice was to draw up 4 ml. of "Pentothal" and 1 ml. of atropine sulphate solution, representing 0·4 mg. (one one-hundred and fiftieth of a grain) in the same syringe. Intravenous injection on the back of the hand was usually possible if the child was given a bowl of hot water and a floating toy for a few minutes prior to induction of anæsthesia. This "sleep dose" was followed by (*a*) ethyl chloride and "open" ether, (*b*) ethyl chloride, "open" ether and ether given by the endotracheal route, (*c*) "Trilene", nitrous oxide and oxygen or (*d*) a relaxant, with nitrous oxide and oxygen given by the endotracheal route.

Results.

The results were very satisfactory in 89% of cases. The most pleasing feature, which emerged rather unexpectedly, was that 98% of the patients experienced complete or nearly complete retrograde amnesia. At first it was thought that the nursing staff questioning the children might have biased the results; but proof came with the low incidence of apprehension at the second or third return trip to the operating theatre for the 'tough" preschool group.

The drying of oral and respiratory tract secretions was found to be inadequate for ether anæsthesia. This inadequacy was overcome with the atropine added to the "Pentothal", but is still a trouble when intravenous induction is not carried out. In the elixir used at the parent Royal Children's Hospital, the amount of hyoscine is proportionately greater, each 4 ml. containing 0·3 mg. of hyoscine. Ian McDonald (1959) has commented on the satisfactory results obtained. He suggests that the "Oblivon" mixture be given in a small, colourful glass. We have found the addition of raspberry and other flavouring to be helpful.

Summary.

1. In an attempt to evolve a satisfactory scheme of preanæsthetic sedation for children, careful records have been kept of approximately 250 children.

2. These records set out the objective opinion of the anæsthetist and the ward sister regarding the child's mental and emotional condition before anæsthesia and after consciousness has been fully regained. The memory of the procedure is especially noted.

3. Two standardized preparations have been used—a combined "Oblivon"-hyoscine preparation given by mouth for children aged less than 10 years, and a combined "Omnopon"-scopolamine ampoule, given by a single hypodermic injection, for children aged 10 years and over and weighing not less than 32 kg. (70 lb.).

4. For particularly nervous or apprehensive children preliminary sedation has been used on the day before operation, or in the morning if operation is planned for the afternoon, the preparation used being "Oblivon C", the long-acting "Oblivon".

5. These procedures have given very satisfactory results and are now accepted as our standard routine. They have proved safe to use and easy to standardize, and easily understood by members of the nursing staff. They have proved superior to all other methods we have pre-

viously used. Children who have had repeated anæsthetics are still unafraid, and since they are the "customers" we consider this to be the final and most important tribute.

Acknowledgements.

It is desired to place on record our appreciation of the many members of the nursing staff who have helped in this investigation, and to thank British Schering Ltd. for their generous supply of "Oblivon" preparations for this investigation.

References.

ARDEN, F. (1956), "People in Hospital", MED. J. AUST., 2: 549.
BOWLBY, J. (1951), "Maternal Care and Mental Health", World Health Organization Monograph Series, Geneva.
BOWLBY, J. (1955), "The Child in Hospital", *Bull. Wld Hlth Org.*, 12: 427.
GALBRAITH, D. (1957), "Problems of Children in a Long-Stay Hospital", MED. J. AUST., 2: 646.
GALLEY, A. H., and TROTTER, P. (1958), "Methylpentynol Carbamate: Pharmacological and Clinical Investigations", *Lancet*, 1: 343.
GUSTERSON, F. R. (1955), "The Management of Children undergoing Tonsillectomy; Premedication with Methylpentynol", *Lancet*, 1; 940.
ILLINGWORTH, R. S. (1958), "Children in Hospital," *Lancet*, 2: 165.
MCDONALD, I. H. (1959), "Premedication of Children", MED. J. AUST., 2: 417.
POWERS, G. F. (1948), "Humanising Hospital Experience," *A.M.A. J. Dis. Child.*, 76: 365.
ROBERTSHAW, F. L. (1955), "Tonsillectomy Without Tears", *Lancet*, 2: 563.
SPENCE, J. (1951), "The Doctor, the Nurse, and the Sick Child", *Amer. J. Nursing*, 51: 14.

ANTI-Rh$_o$(D) ANTIBODIES PRODUCED BY ISO-IMMUNIZATION IN AN Rh POSITIVE MOTHER OF THE UNUSUAL GENOTYPE R^{1}r^y (CD^{e}e/CdE).

By R. T. SIMMONS AND VERA I. KRIEGER,
The Commonwealth Serum Laboratories and the Department of Pathology, Royal Women's Hospital, Melbourne.

IN iso-immunization in pregnancy and in blood transfusion, the most common antibody found in Rh-negative individuals is anti-Rh$_o$ (D), and this is stimulated by an Rh$_o$ (D) antigen. However, early work by Wiener (1944) and by Stratton (1946) showed the existence of Rh$_o$ (D) variants which Stratton called D^u. Such variants were shown by Race, Sanger and Lawler (1948) to be "high-grade", in that they agglutinated in varying strengths with some anti-Rh$_o$ (D) sera and not with others, or "low-grade" when the individual's red cells reacted only with incomplete anti-Rh$_o$ (D) sera by the Coombs antiglobulin test.

Van Loghem (1947) reported the production of anti-Rh$_o$ (D) antibodies in an Rh-negative volunteer apparently in response to a "low-grade" Rh$_o$ (D^u) antigen which, initially, was not known to be present in the donor's cells in association with the rh' (C) antigen. However, in the light of present knowledge, the apparent polyvalent (anti-CD) antibody produced may have included anti-G (rh^G) described by Allen and Tippett (1958), and was not of anti-Rh$_o$ (D) plus anti-rh' (C) specificity as was reported. Another case of G (rh^G) iso-immunization has recently been described by Jakobowicz and Simmons (1959).

Shapiro (1951) found a high-titre (512) anti-Rh$_o$ (D) antibody in the serum of a pregnant mother who possessed a "high-grade" Rh$_o$ (D^u) variant in her own red cells. These cells were agglutinated by four out of eight potent anti-Rh$_o$ (D) testing sera. This was probably the first example reported of an Rh-positive (D^u) individual producing anti-Rh$_o$ (D) antibodies. Argall, Ball and Trentelman (1953) also found anti-Rh$_o$ (D) antibodies in the serum of an obstetrical patient possessing an Rh$_o$ (D^u) variant in her red cells. Race and Sanger (1958) reported that they confirmed an identical case, discovered presumably in 1951 by Dr. C. A. Holman, and in the addendum to their book refer to two other known examples.

Van Loghem and van der Hart (1954) showed that anti-Rh$_o$ (D) antibodies might occur in Rh$_o$ (D) positive individuals suffering from acquired hæmolytic anæmia.

Rosenfield, Haber and Gibbel (1958) reported finding a Puerto Rican woman of genotype *R^{o}r* (*cDe/cde*) who had anti-Rh$_o$ (D) in her serum. Geiger and Wiener (1958) reported at the same Congress in 1956 that they had discovered an Rh$_o$ (D) positive mother whose serum contained potent anti-Rh$_o$ (D) antibodies which caused erythroblastosis fœtalis.

Wiener, Geiger and Gordon (1957) have discussed the mosaic nature of the Rh$_o$ (D) factor in human blood; they state that this factor is serologically complex, and in addition to reacting with standard anti-Rh$_o$ (D) serum it may react with other anti-Rh sera of different specificities, which they designated anti-Rh^A, anti-Rh^B and anti-Rh^C, etc. In rare cases in which any one of these components is missing, the individual may become sensitized to the missing factor during pregnancy or by blood transfusion. Recent findings on this aspect have been briefly discussed by Wiener and Wexler (1958) and in more detail by Unger and Wiener (1959), and by Wiener and Unger (1959).

Grove-Rasmussen and Levine (1954) reported the occurrence of one example of anti-Rh$_o$ (D) and two examples of anti-rh'' (E) antibodies in individuals in the absence of known antigenic stimulus. Jakobowicz (1947) found an anti-Rh$_o$ (D) antibody in a young, healthy, Rh-negative male. Neither the man nor his mother had any knowledge of his having received treatment involving the use of blood or serum. The antibody was of the incomplete type with a serum-albumin titre of 32. It could be demonstrated with the following cell suspensions: plasma, plasma-albumin, albumin and thick drop; it was only very weakly demonstrated in serum. It was barely demonstrable with the indirect Coombs test. The serological findings were confirmed by one of us (R.T.S.). The case was followed for about two years, and there was no change in the antibody or its titre. It appeared that this was a true example of a naturally occurring anti-Rh$_o$ (D) antibody.

The various and unusual types of immunization referred to above indicate the complexity of the Rh$_o$ (D) blood antigen as part of the large and important Rh blood-group system. In one particular aspect of immunization—namely, that in which anti-Rh$_o$(D) antibody has been found in the serum of individuals who possess in their red cells an Rh$_o$ (D^u) variant—it would seem that only five examples have been found, and in only three of these have the details been published. As millions of human sera have now been tested, the occurrence of such atypical cases is indeed rare. The case to be reported here is such an example, and it is even more unusual because the genotype of the patient R^{1}r^y (*CD^{e}e/CdE*) is exceptional.[1] The potent anti-Rh$_o$ (D) antibody was responsible for hæmolytic disease in the third baby, who was treated by simple blood transfusions. The present child was normal because his genotype was *r^{y}r* (*CdE/cde*) and thus he could not be affected by anti-Rh$_o$ (D) antibody.

Report of a Case.

Mrs. E.'s first two babies were normal, and the third developed mild jaundice on the fourth day. He was admitted to hospital on the fifth day with a hæmoglobin value of 50% and an enlarged spleen, and giving a positive response to the Coombs (antiglobulin) test. The baby received two simple transfusions of 200 ml. of Rh-negative blood during a period of one month, and subsequently remained normal. The fourth and recent baby was normal at birth, and has remained normal.

Discussion.

The results of the Rh blood-group typing of Mrs. E.'s family are given in Table I.

[1] A. S. Wiener in indicating the presence of an Rh$_o$ variant uses a Germanic R instead of the normal R.

TABLE I.
The Rh Blood Types of Mrs. E.'s Family.[1]

Subject.	Antisera.							Result; Genotype.
	Rh_o (D).	rh′ (C).	rh^w (C^w).	rh'' (E).	hr′ (c).	hr″ (e).	Rh_o (D) Antiglobulin Test.	
Mr. E.	+	+	−	−	+	+	·	R^1r (*CDe/cde*).
Mrs. E.	−	+	−	+	−	+	+	R^1r^y (CD^ue/CdE).
Baby E.	−	+	−	+	+	+	−	rr^y (*CdE/cde*).
M.E.	+	+	−	+	−	+	·	R^1r^y (*CDe/CdE*).

[1] Blood samples from two other living children were not obtained.

It will be seen that Mr. E. is of genotype R^1r (*CDe/cde*), and Mrs. E. is R^1r^y (CD^ue/CdE). The last baby, her fourth, who did not have hæmolytic disease—a finding which started a family investigation—was found to be of genotype rr^y (*CdE/cde*). Prior to her confinement, it was known that Mrs. E.'s serum contained incomplete anti-Rh_o (D) antibodies to a titre of 1: 2000.

In the present instance the mother's Rh genotype is extremely rare, in that she possesses the rr^y (*CdE*) gene associated with a "low-grade" Rh_o (D^u) variant R^1 (CD^ue), and while possessing this variant has been stimulated by an Rh_o (D) antigen to produce a potent incomplete antibody apparently of normal anti-Rh_o (D) specificity. In tests with a panel of cells of known blood groups and types, Mrs. E.'s serum behaved as a typical anti-Rh_o (D) serum, and only in extremely rare instances would it fail to agglutinate cells shown to be Rh-positive with standard anti-Rh_o (D) testing serum. The trend today with all blood group systems is to show that they are more complex than was thought earlier. However, it has been known for many years that the Rh_o (D) antigen was complex by the demonstration that, in addition to an apparently normal antigen, there were numerous "high-grade" and "low-grade" variants. To ensure the maximum degree of accuracy in clinical Rh testing in Australia, it has been the policy of the Commonwealth Serum Laboratories to supply at any one time two agglutinating anti-Rh_o (D) sera, so that cells found to give a negative result with one serum could always be tested with the second serum. Even so, occasional cell samples thought to be Rh_o-negative are still encountered (as in the present case) which prove to be Rh-positive when sensitized with incomplete anti-Rh_o (D) serum and subjected to the Coombs anti-globulin test. The recent studies made by Wiener and by Unger in New York have shown that the Rh_o (D) factor is serologically complex, and that in addition to reacting with standard anti-Rh_o (D) serum it may also react with other anti-Rh sera of slightly different specificities. These antisera found in normally reacting Rh_o (D) positive individuals, although rare, are part of a series of which other specific examples are yet to be found. Fortunately the complexity of the Rh_o (D) antigen, as shown above, does not complicate clinical Rh testing. When evidence of unexpected maternal iso-immunization is encountered, the problem can usually be solved by referring family blood samples and the case history to the nearest central blood-testing laboratory.

Summary.

A case is described in which a mother of the unusual genotype R^1r^y (CD^ue/CdE) possessing a "low-grade" Rh_o (D^u) variant produced anti-Rh_o (D) antibodies to a titre of 1:2000 as the result of pregnancy. The present child, of genotype rr^y (*CdE/cde*), was unaffected, while the previous Rh_o (D) positive baby suffered from hæmolytic disease and was treated by two simple blood transfusions. Reference is made to the complexity of the Rh_o (D) antigen of the Rh blood group system, and the relevant literature is briefly mentioned. The immunization of Rh_o (D) positive individuals during pregnancy or by blood transfusion, with some variant of the Rh_o (D) factor which they themselves lack, is fortunately very rare. The findings do not complicate clinical Rh testing; but cases in which unexpected iso-immunization happens should always be referred to a central testing laboratory for investigation.

References.

ALLEN, F. H., and TIPPETT, P. A. (1958), "A New Rh Blood Type which Reveals the Rh Antigen G", *Vox Sang. (Basel)*, 3: 321.

ARGALL, C. I., BALL, J. M., and TRENTLEMAN, E. (1953), "Presence of Anti-D Antibody in the Serum of a D^u Patient", *J. Lab. clin. Med.*, 41: 895.

GEIGER, J., and WIENER, A. S. (1958), "An Rh_o Positive Mother with Serum Containing Potent Rh Antibodies, Apparently of Specificity Anti-Rh_o Causing Erythroblastosis Fetalis", *Proceedings of the Sixth Congress of the International Society for Blood Transfusion"*, 36.

GROVE-RASMUSSEN, M., and LEVINE, P. (1954), "The Occurrence of Anti-D and Anti-E in the Absence of Obvious Antigenic Stimuli", *Amer. J. clin. Path.*, 24: 145.

JAKOBOWICZ, R. (1947), unpublished data.

JAKOBOWICZ, R., and SIMMONS, R. T. (1959), "Iso-immunization in a Mother which Demonstrates the 'New' Rh Blood Antigen G (rh^G) and Anti-G (rh^G)", MED. J. AUST., 2: 357.

RACE, R. R., and SANGER, R. (1958), "Blood Groups in Man", Blackwell, Oxford.

RACE, R. R., SANGER, R., and LAWLER, S. D. (1948), "Rh Genes Allelomorphic to D", *Nature*, 162: 292.

ROSENFIELD, R. E., HABER, G., and GIBBEL, N. (1958), "A New Rh Variant", *Proceedings of the Sixth Congress of the International Society for Blood Transfusion"*: 90.

SHAPIRO, M. (1951), "The ABO, MN, P and Rh Blood Group Systems in South African Bantu; Genetic Study", *South African med. J.*, 25: 187.

STRATTON, F. (1946), "A New Rh Allelomorph", *Nature*, 158: 25.

UNGER, L. J., and WIENER, A. S. (1959), "Observations on Blood Factors Rh^A, Rh_α, Rh^B and Rh^C", *Amer. J. clin. Path.*, 31: 95.

VAN LOGHEM, J. J. (1947), "Production of Rh Agglutinins Anti-C and Anti-E by Artificial Immunization of Volunteer Donors", *Brit. med. J.*, 2: 958.

VAN LOGHEM, J. J., and VAN DER HART, M. (1954), "Varieties of Specific Autoantibodies in Acquired Hæmolytic Anæmia", *Vox Sang. (Basel)*, 4: 2, 129.

WIENER, A. S. (1944), "The Rh Series of Allelic Genes", *Science*, 100: 595.

WIENER, A. S., and UNGER, L. J. (1959), "Rh Factors Related to the Rh_o Factor as a Source of Clinical Problems", *J. Amer. med. Ass.*, 169: 696.

WIENER, A. S., and WEXLER, I. B. (1958), "Heredity of the Blood Groups", Grune & Stratton, New York.

WIENER, A. S., GEIGER, J., and GORDON, E. B. (1957), "Mosaic Nature of the Rh_o Factor of Human Blood", *Exp. Med. Surg.*, 15: 75.

Reports of Cases.

HYPOPITUITARISM A CAUSE OF REFRACTORY ANÆMIA.

By W. HAMILTON SMITH,
St. Vincent's Hospital, Melbourne.

IN this paper are recorded six cases of hypopituitarism which presented as cases of anæmia refractory to the usual hæmatinics. The presenting or prominent symptom was lassitude or easy fatigability, considerable pallor was noted on physical examination, and anæmia of varying grades of severity was found on examination of the blood.

The anæmia was found to be unresponsive to the usual measures, and treatment for periods of one to ten years was unavailing until the evidence of hypopituitarism was recognized.

Case I.

A married woman, aged 58 years, was admitted to hospital in deep coma after 36 hours of dry retching. She had been under treatment intermittently for ten years for "pernicious anæmia". Inquiry disclosed the occurrence of an abortion at six weeks 20 years earlier. Lassitude, sensitivity to cold, constipation and amenorrhœa developed insidiously over the ensuing years.

On examination of the patient in hospital, her blood pressure was not recordable, and her temperature was less than 96° F. Recovery followed the application of warmth, intravenous administration of glucose and saline and massive doses of cortisone. Later examination showed poor nutrition, a finely wrinkled waxy face, scanty dull hair, sparse eyebrows and absence of axillary and pubic hair. The thyroid gland was impalpable. The blood pressure had risen to 180/110 mm. of mercury. The hæmoglobin value was 9·6 grammes per 100 ml. (65%). The red cells were normochromic, and there were moderate anisocytosis and poikilocytosis and some macrocytosis. The leucocytes numbered 4700 per cubic millimetre with a relative lymphocytosis. The serum cholesterol content was 320 mg. per 100 ml., the basal metabolic rate was −30%, and urinary excretion of 17-ketosteroids was 3·0 mg. per 24 hours. There was poor excretion of a water load. Free hydrochloric acid was present in the gastric juice. A trial was made of thyroid administration only in a initial dose of 0·25 grain increasing to 2 grains per day over three months. This caused a gain of half a stone in weight, relief of constipation, increased auditory acuity, a fall of serum cholesterol content to 220 mg. per 100 ml., a rise in the urinary 17-ketosteroid excretion to 9·0 mg. per 24 hours, and a rise of hæmoglobin value to 12·4 grammes per 100 ml. (86%), with a reticulocytosis of 5%. This improvement was not maintained, however, until the addition of cortisone, in a dosage of 25 mg. per day, achieved good health, except for two episodes of left ventricular failure relieved by the usual methods and reduction of the dose of thyroid to 1·0 grain per day.

Case II.

A married woman, aged 33 years, complained of lassitude of three years' duration, at times feeling so weak that she could hardly speak, and had been under treatment for two years since the finding of a hæmoglobin value of 9·9 grammes per 100 ml. (68%). Examination of a blood smear showed normocytic normochromic erythrocytes. There were 5400 leucocytes per cubic millimetre, 10·5% being eosinophils. On inquiry, it was found that the patient was one stone underweight, was constipated and felt the cold bitterly, although she was exhausted on hot days. She had had infrequent menses until amenorrhœa supervened seven months before the examination. The skin showed patches of light brown pigmentation and of leucoderma on the arms, face and neck. The axillary hair was scanty, the pubic hair was normal, the head hair was dull and lifeless. The blood pressure was 120/90 mm. of mercury, and on a hot day fell to 105/75 mm. of mercury. X-ray examination of the chest showed a small heart shadow. The serum sodium and potassium levels were 123 and 4·3 mEq/l. respectively. There was poor excretion of a water load, and an intravenous insulin tolerance test disclosed hypoglycæmia unresponsiveness. A diagnosis of Addison's disease was made, and considerable improvement followed the administration of desoxycorticosterone acetate until suppurative mastitis developed, which persisted for three months despite surgical drainage and the exhibition of antibiotics. At this time a low basal metabolic rate and an electrocardiogram showing very flat *T* waves as found in hypothyroidism indicated the diagnosis of hypopituitarism. Treatment was then begun with thyroid, 2 grains per day, and cortisone, 18·75 mg. per day. This achieved restoration of well-being, resolution of the mastitis, restoration of upright *T* waves on the electrocardiogram and correction of the anæmia, with elevation of the hæmoglobin value to 12·5 mg. per 100 ml. (86%).

Case III.

A single man, aged 47 years, had been investigated four years prior to his present admission to hospital as the result of a two years' history of lassitude, poor appetite and impotence. At this time the hæmoglobin value was 8·3 grammes per 100 ml. (57%), and the erythrocytes were normocytic and moderately hypochromic. The cause of the anæmia was not then established.

When he was examined four years later, the patient still tired easily and felt stiff all over until he warmed up. Inquiry revealed poor tolerance of cold, constipation, impotence and declining beard growth. His nutrition was good, but his skin was pale, dry and scaly. Axillary hair was absent and pubic hair was scanty. The thyroid gland was impalpable. The voice was slow and deep. The blood pressure was 128/80 mm. of mercury. The hæmoglobin value was 9·6 grammes per 100 ml. (68%) and the erythrocytes were normocytic and normochromic. There were 7200 leucocytes per cubic millimetre, 52% being neutrophils, 39% lymphocytes, 2% basophils and 7% monocytes; no eosinophils were present. The bone marrow showed normoblastic erythropoiesis. The serum cholesterol content was 300 mg. per 100 ml. and urinary 17-ketosteroid excretion 2·5 mg. per 24 hours. The basal metabolic rate was −20%. The electrocardiogram showed minor depression of *S-T* segments and very flat *T* waves. There was poor excretion of a water load, and an intravenous insulin tolerance test showed hypoglycæmia unresponsiveness. On a daily régime of cortisone (25 mg.) and thyroid (2 grains), together with a monthly intramuscular injection of a depot preparation of testosterone (100 mg.), there was a satisfactory symptomatic improvement, and the hæmoglobin value rose to 12·8 grammes per 100 ml. (88%).

Case IV.

A married man, aged 39 years, presented with an 18 months' history of lassitude and loss of two stone in weight, which had failed to respond to treatment for anæmia with tablets and liver injections. His complexion was sallow, and his blood pressure was 140/90 mm. of mercury. The hæmoglobin value was 9·7 grammes per 100 ml. (66%), and the erythrocytes were normocytic and normochromic. There were 7000 leucocytes per cubic millimetre, 46% being neutrophils, 30% lymphocytes, 14% monocytes, 9% eosinophils and 1% basophils. The bone marrow was normoblastic, with a relative increase of early and intermediate forms and an increased number of eosinophils. Free hydrochloric acid was present in the gastric juice.

On reexamination 12 months later, the patient reported persistent lassitude and frequent headaches. His visual acuity was reduced. There was evidence of left optic atrophy. The basal metabolic rate was −13%. At operation a pituitary tumour was removed.

On examination two years later, the patient was well nourished, the skin was pale and slightly puffy and wrinkled about the eyes, the beard hair and axillary and pubic hair were scanty, the hands were soft and doughy and the fingers were fusiform. The blood pressure was 135/85 mm. of mercury. The hæmoglobin value was 11·6 grammes per 100 ml. (80%), and the erythrocytes were normocytic and normochromic. The serum cholesterol content was 328 mg. per 100 ml., and the urinary 17-ketosteroid excretion was 1·5 mg. per 24 hours. The number of circulating eosinophils failed to fall after the intravenous administration of ACTH. An electrocardiogram showed flat *T* waves. After treatment with cortisone (37·5 mg. per day) and thyroid (2 grains per day) the hæmoglobin value rose to 12·4 grammes per 100 ml. (86%). Further improvement followed the intramuscular injection of depot testosterone, 100 mg. every three to four weeks, and the hæmoglobin value rose to 14·3 grammes per 100 ml. (99%).

Case V.

A married man, aged 43 years, reported occasional headaches, lassitude and swelling of the ankles of 12

months' duration, during which time he had been under treatment for anæmia with iron and liver injections without benefit. Inquiry revealed that he had undergone operation for a "pituitary cyst" eight years earlier. Latterly he had lost weight, from 9 stone 7 lb. to 8 stone 4 lb., he felt "no good at all" in the cold weather, his voice periodically became husky and he experienced rheumatic pains in the shoulders and legs. He seldom had to shave, had little libido and rarely had erections. His skin was sallow, his face was wrinkled, and axillary and pubic hair was absent. The thyroid gland was impalpable. The fingers were puffy and fusiform. The blood pressure was 110 to 120/75 to 80 mm. of mercury. The hæmoglobin value was 10·8 grammes per 100 ml. (74%), and the erythrocytes were normochromic and normocytic with minor anisocytosis. The leucocytes numbered 9100 per cubic millimetre, 53% being neutrophils, 30% lymphocytes, 9% monocytes and 7% eosinophils. The serum cholesterol content was 120 mg. per 100 ml. An electrocardiogram showed low-voltage complexes and flat *T* waves, which were inverted in Leads I, II, III, aVF, and V_1 to V_4. Treatment was begun with cortisone (25 to 37·5 mg. per day) and thyroid (1 to 2 grains per day, later grains 3 per day), and there was marked improvement in vigour and well-being with a gain in weight of one and a half stone. Further improvement followed the addition of depot testosterone by intramuscular injection, and the hæmoglobin value rose to 13·6 grammes per 100 ml. (95%).

Case VI.

A married man, aged 46 years, presented with a history of lassitude and dyspnœa on exertion of six or seven years' duration, during which time he had been under treatment for "pernicious anæmia" with liver injections without benefit. Inquiry disclosed that he had come to shave on only every second or third day, had become impotent, was constipated and felt the cold badly. His face was finely wrinkled and pale, his state of nutrition was average, and his skin was dry and rough. Axillary hair was absent, pubic hair was scanty. The blood pressure was 145/80 mm. of mercury. The hæmoglobin value was 10·7 grammes per 100 ml. (74%), and the erythrocytes were normocytic and normochromic. An electrocardiogram showed very flat *T* waves. The patient could not be persuaded to undergo further tests or to return for treatment.

Discussion.

Pallor and anæmia have frequently been described as part of the clinical picture of hypopituitarism. In 1937 Snapper and others descibed megalocytic hyperchromic anæmia in hypopituitarism. Escamilla and Lisser (1942) recorded anæmia and achlorhydria in this condition, quoting an average hæmoglobin content of 65% and occasional eosinophilia. Daughaday and colleagues (1948) reported moderate anæmia in subjects of hypopituitarism with a variable colour index and a normal leucocyte count. Sheehan and Summers (1949) pointed out the frequent finding of a striking pallor of the face, sometimes described as waxy-white or alabaster. This they attributed to loss of melanin from the skin and to lack of the normal capillary flush in exposed skin. The pallor they reported was more marked than would be expected from the degree of anæmia usually present, which was of moderate degree and characterized by normochromic red cells. Only exceptionally had macrocytosis been reported, and infrequently eosinophilia. Cook and colleagues (1951) recorded two of seven patients with hypopituitarism having been under treatment for unexplained anæmia, which was of moderate degree and normochromic with mild leucopenia. In 1952 Summers reported moderate anæmia, usually with normochromic red cells and achlorhydria, refractory to the usual hæmatinics. Less commonly he recorded hypochromic anæmia, usually in patients with features suggestive especially of hypothyroidism, and occasionally normocytic hypochromic anæmia. Little improvement was reported to follow the exhibition of thyroid or androgens, but cortisone produced some improvement.

In the six cases reported here the hæmoglobin value ranged from 8·3 to 10·2 grammes per 100 ml. (57% to 70%). The erythrocytes were normocytic and normochromic, except in one case in which moderate anisocytosis and poikilocytosis and some macrocytosis were present, and in another in which moderate hypochromia was found. Examination of the bone marrow showed normoblastic erythropoiesis. The leucocyte count ranged from 4700 to 9100 per cubic millimetre. There was relative lymphocytosis in one case and relative eosinophilia in two cases, otherwise the distribution of leucocytes was normal. In two cases in which the test was made, free hydrochloric acid was present in the gastric juice.

The anæmia responded satisfactorily and reasonably promptly to hormone therapy in each case, a reticulocytosis of 5% being recorded in one case. This response was achieved by combined cortisone and thyroid therapy, usually in a daily dosage of 25 mg. and 2 grains respectively, except in two cases, in which cortisone and thyroid produced only partial correction of the low hæmoglobin value which was further improved by the addition of testosterone. This hæmatopoietic effect of androgens has been reported elsewhere (Daughaday *et alii*, 1948; Kennedy and Gilbertsen, 1957).

The recognizable features of hypopituitarism which suggested the diagnosis in these cases were amenorrhœa in the female or loss of libido or potency in the male, sensitivity to cold, constipation, "rheumatic" pains, deep husky voice and loss or sparseness of axillary and pubic hair. The skin was usually pale and smooth and the face finely wrinkled, but less commonly the skin was dry and the face coarse and puffy as in myxœdema. In one case light-brown pigmentation of exposed skin caused confusion with Addison's disease; but usually the skin was conspicuously pale, and normally pigmented areas such as the nipples showed diminished pigmentation. The most helpful physical sign was absence or paucity of axillary and pubic hair, although it has to be borne in mind that a considerable proportion of normal women lack axillary hair. The invisibility of the axillæ unless the arms are deliberately raised and the modest veiling of the pubic area must be blamed largely for failure to discover this physical sign. Once suspicion of endocrine hypofunction was raised, the diagnosis was usually readily confirmed by special tests. The basal metabolic rate and electrocardiogram were useful and simple means of giving support to the diagnosis, which could usually be established without recourse to more specialized tests that might not always be available.

In only two of the six cases was a cause of the pituitary deficiency discovered—in both cases a pituitary tumour. In one case there was a history of an abortion at six weeks unassociated with excessive blood loss or other complication; but this surely cannot be taken as an example of Sheehan's syndrome of post-partum necrosis of the pituitary.

Summary.

1. Six cases of hypopituitarism are reported, in which the presenting or prominent feature was anæmia refractory to the usual hæmatinics.

2. The anæmia was usually normocytic and normochromic, with a normal leucocyte count and normoblastic bone marrow.

3. A satisfactory response was obtained to cortisone and thyroid administration, supplemented in some cases by testosterone.

References.

COOK, J. E., BEAN, W. B., FRANKLIN, M., and EMBRICK, J. F. (1951), "Postpartum Necrosis of the Anterior Lobe of the Pituitary Gland; Sheehan's Disease", *A.M.A. Arch. intern. Med.*, 87: 517.

DAUGHADAY, W. H., WILLIAMS, R. H., and DALAND, G. A. (1948), "The Effect of Endocrinopathies on the Blood", *Blood*, 3: 1342.

ESCAMILLA, R. F., and LISSER, R. (1942), "Simmond's Disease, a Clinical Study with Review of the Literature; Differentiation from Anorexia Nervosa by Statistical Analysis of 595 Cases, 101 of which were Proved Pathologically", *J. clin. Endocr.*, 2: 65.

KENNEDY, B. J., and GILBERTSEN, A. S. (1957), "Increased Erythropoiesis Induced by Androgenic Hormone Therapy", *New Engl. J. Med.*, 256: 719.

SHEEHAN, H. L., and SUMMERS, V. K. (1949), "Syndrome of Hypopituitarism", *Quart. J. Med.*, 18: 319.

SNAPPER, I., GROEN, J., HUNTER, D., and WITTS, L. J. (1937), "Achlorhydria, Anæmia and Subacute Combined Degeneration in Pituitary and Gonadal Insufficiency", *Quart. J. Med.*, 6: 195.

SUMMERS, V. K. (1952), "The Anæmia of Hypopituitarism", *Brit. med. J.*, 1: 787.

POST-PARTUM BROAD LIGAMENT HÆMATOMA.

By JEAN MURRAY-JONES, M.R.C.O.G.,

Clinical Assistant in Obstetrics, King Edward Memorial Hospital for Women, Subiaco, Western Australia.

BROAD LIGAMENT HÆMATOMA is an unusual complication of the puerperium, and relatively few cases have been reported in the literature.

About 400 cases of obstetric hæmatoma have been reported since 1554, when Rueff first described the complication (Pieri, 1958). Authors have reported vulval and paravaginal hæmatoma more frequently than subperitoneal hæmatoma, and there are only 45 references to the latter variety in the English literature. Williams (quoted by Davis, 1940) records 33 cases; McElin *et alii* (1954) report seven cases; Ingraham, in the discussion on Hamilton (1940), reports one case; Danforth, in the discussion on Walsh and Ganser (1948), records two cases; Danby (1923) records one case; Sotto *et alii* (1958) record one case.

The complication can occur during or just after delivery, or later in the puerperium. It is believed that trauma is the major causal factor of immediate hæmatoma, and that pressure necrosis is the initiator of late hæmatoma. Other causes listed are toxæmias of pregnancy, blood dyscrasias, pelvic varicosities, unduly vigorous uterine massage in dealing with post-partum hæmorhage, an excessive dose of pituitary extract leading to rupture of the cervix or uterus, improperly repaired cervical lacerations, and large babies. Primigravidæ are thought to be more disposed to this disorder than multiparæ.

The diagnosis must be considered when there are signs of internal hæmorrhage and no obvious lesions in the birth canal to account for it. Persistent post-partum abdominal pain, together with shock, a high fundus and a unilateral fluctuating pelvic tumour, present a classical picture. Anæmia and fever are other salient features (McElin *et alii*, 1954). Ileus with distension and severe thigh pain on the affected side (Greenhill, 1952) and unilateral leg œdema (Hamilton, 1940) have been observed in these cases also.

Treatment along active lines is recommended by all authorities. Some advocate immediate incision and evacuation of clot in all cases (Hamilton, 1940; Walsh and Ganser, 1948; Pieri, 1958). Others advise active therapy only when this is indicated — in cases in which the tumour is of large size when first discovered, or when it subsequently expands (McElin *et alii*, 1954; Lyons, 1949). It is interesting to note that McElin *et alii* treated conservatively seven patients with broad ligament hæmatoma. They reported that morbidity and length of stay in hospital were increased and more blood replacement was required in this type of complication than in other varieties of perigenital hæmatoma. No maternal deaths occurred in their series, and no patients required surgical intervention for the hæmatoma problem. Of the 45 cases of subperitoneal hæmatoma reported to date, 22 occurred prior to 1880 with a mortality of 73%. In these early cases the hæmatomas were late in being diagnosed, or the patients were the victims of expectant treatment. The cause of death was concealed hæmorrhage, or rupture of the hæmatoma into the peritoneal cavity, or sepsis (Hamilton, 1940).

In four cases of subperitoneal hæmatoma (Danby, 1923; Danforth, in discussion on Walsh and Ganser, 1948; Walsh and Ganser, 1948) the bleeding had to be controlled by hysterectomy. Raymond Pieri (1958) suggested procedures that provided a reasonable expectation that blood loss would be staunched effectively and the intact uterus preserved. He recommended that indirect hæmostasis could be achieved by ligation of the anterior division of the internal iliac artery at a point 1·5 in. below the brim of the true pelvis at the level of the greater sciatic notch. In cases in which this measure did not suffice, he recommended that a unilateral ligation of the uterine vessel on the affected side be performed also. Additional aid in controlling bleeding may be obtained from absorbable hæmostatic gauze applied directly to the raw subperitoneal base before closing of the peritoneum over the field. Supportive treatment with blood transfusion and antibiotics is imperative in all cases.

Clinical Record.

Mrs. A., a primigravida, aged 20 years, was admitted to hospital on May 31, 1959, in active labour at term. Antenatal care had been adequate. At the thirty-second week she developed a mild iron-deficiency anæmia which responded satisfactorily to treatment. There was no evidence of toxæmia. After her admission to hospital it was observed that the blood pressure was 114/78 mm. of mercury and the urine was normal; the fœtus was presenting by the vertex in the left occipito-anterior position, and the fœtal heart rate was 136 per minute. Labour progressed normally, and after 12 hours the patient delivered spontaneously an infant weighing 9 lb. After a second stage lasting for 50 minutes the head crowned rapidly and was born without an episiotomy. Fifteen minutes later the placenta was delivered, assisted by fundal pressure. There was a post-partum loss of 16 oz. of blood during the third stage, which lasted 15 minutes.

After delivery the patient complained of suprapubic pain. Examination revealed that her general condition was satisfactory, and the fundus uteri was firm and tender. She was given "Omnopon" (one-sixth of a grain), and a small clitoral tear was repaired under local anæsthesia. Eleven hours after delivery she became shocked, but recovered after a transfusion of three pints of blood. The perineum and vulva were painful and œdematous.

During the next four days she developed lower abdominal pain and dysuria, and an intermittent rise of temperature to 100° F. The lower part of the abdomen was tender on palpation, and the fundus of the bladder was 2 in. above the symphysis pubis. A catheter specimen of urine was examined bacteriologically and yielded a growth of non-hæmolytic streptococci sensitive to "Chloromycetin".

On the fifth day after delivery her condition had not improved despite treatment, and she complained of pain in the right side. The abdomen was slightly distended. There was a tender mass in the right iliac fossa. Vaginal examination revealed a soft, fluctuating mass 12 cm. in diameter in the right fornix. This was continuous with the abdominal mass. The uterus was displaced toward the left hypochondrium. The cervix was intact. Blood examination showed that the hæmoglobin value had fallen from 10·4 to 9·0 grammes per 100 ml. in 24 hours.

She was given a transfusion of two pints of blood and a laparotomy was performed. At operation a right broad ligament hæmatoma about 12 cm. in diameter was found. The normal anatomy was greatly distorted by the tumour, which had displaced the uterus (14 cm. long) and the bladder into the left lumbar region. The broad ligament was incised parallel and anterior to the round ligament and all blood clot was cleared away. The starting point of the bleeding could not be determined, as the tissues of the broad ligament had been grossly infiltrated and ploughed up by hæmorrhage. However, no free bleeding was apparent. The uterus was examined and found intact. Finally, the peritoneal edges of the broad ligament were approximated by interrupted Lembert's sutures and the abdomen was closed.

The post-operative course was uneventful, and the patient was discharged home in good condition on the fourteenth day after operation. Post-natal examination revealed a normal cervix, an involuting uterus and residual thickening in the right fornix.

Comment.

This case records an obstetrical hæmatoma formed immediately post partum, and probably produced by the trauma resulting from the natural forces of labour. The condition was recognized early and treated actively and effectively with surgery, blood transfusion and antibiotics.

Acknowledgements.

I wish to thank Professor Gordon King and Dr. H. Rees, superintendent of the King Edward Memorial Hospital, for their assistance in dealing with this case.

References.

DANBY, A. B. (1923), *Proc. roy. Soc. Med.*, 17 : 21.

DAVIS, C. H. (1940), "Gynæcology and Obstetrics", Prior, Hagerstown, 1 : 15.

GREENHILL, J. P. (1952), "Surgical Gynecology", Year Book Publishers, Chicago.

HAMILTON, H. G. (1940), "Postpartum Labial or Paravaginal Hæmatomas", *Amer. J. Obstet. Gynec.*, 39 : 642.

LYONS, A. W. (1949), "Postpartum Hæmatomas", *New Engl. J. Med.*, 240 : 461.

MCELIN, T. W., BOWERS, V. M., jr., and PAALMAN, R. J. (1954), "Puerperal Hæmatomas", *Amer. J. Obstet. Gynec.*, 67 : 356.

PIERI, J. (1958), "Pelvic Hæmatomas Associated with Pregnancy", *J. Obstet. Gynæc. Brit. Emp.*, 12 : 249.

SOTTO, L. S. J., and COLLINS, R. J. (1958), "Perigenital Hæmatomas", *J. Obstet. Gynæc. Brit. Emp.*, 12 : 260.

WALSH, F. J., and GANSER, H. I. (1948), "Puerperal Perigenital and Perineal Hæmatomas", *Amer. J. Obstet. Gynec.*, 56 : 873.

MILIARY TUBERCULOSIS AT THE EXTREMES OF LIFE.

By LESLIE WILLIAMS,
Queen Victoria Hospital, Melbourne.

MILIARY TUBERCULOSIS is not usually difficult to diagnose if it is suspected. The two cases here reported illustrate some of its diverse and misleading manifestations.

Case I.

Mrs. A. was aged 85 years when she died in August, 1957. Little is known of her past medical history, except that she had been operated on for perforated peptic ulcer about 20 years earlier. After this she developed an incisional hernia. This gave no trouble until about eight weeks before her death, when it suddenly became strangulated. The patient underwent an emergency operation, which included resection of a length of small bowel. Before this her health had been good, and she was accustomed to doing various household duties.

After her discharge from hospital, the patient was never very well; she was no longer able to get herself up and dressed, and she was confused mentally. Her family doctor prescribed digitalis. She did not improve, and was readmitted to hospital five weeks after the operation. She was breathless and mentally confused.

Her condition changed little during this final stay in hospital. Slight fever, which developed towards the end of the first week after her admission, settled without chemotherapy. Breathlessness persisted, and X-ray films showed marked increase in the size of the cardiac outline. Her general condition deteriorated steadily, and she died 21 days after readmission.

At autopsy, the outstanding finding was the very large heart and pericardium (1·4 kg.). The pericardium was grossly thickened, and the pericardial sac was obliterated except for a small posterior pocket, which contained thin, turbid fluid. Although the pericardium was adherent, it could be peeled off with firm pressure, leaving surfaces covered by fibrin. The heart muscle was quite thin, appearing to be largely replaced by yellow, fatty tissue. The heart valves looked normal, and there was only a little atheroma in the ascending aorta and coronary arteries.

Macroscopic examination of the lungs showed no evidence of active tuberculosis. There were a few tiny subpleural nodules in the apical segment of the upper lobe of the left lung, but no pleural adhesions. Both lower lobes were partially collapsed by pleural effusions. Except for the recent, well-healed intestinal anastomosis, no macroscopically evident abnormalities were seen in the abdominal organs.

Microscopic examination revealed numerous granulomata scattered throughout the fibrinous exudate on the surfaces of the heart and pericardium. Numerous leucocytes, including polymorphonuclear leucocytes, lymphocytes and plasma cells, were present in this exudate and in the superficial part of the adipose tissue in the epicardium. Ziehl-Neelsen staining showed large numbers of acid-fast bacilli in the granulomatous lesions.

Sections taken from the upper lobes of the lungs contained rare tubercles, in some of which acid-fast bacilli were demonstrated, but sections from the other lobes showed no evidence of tuberculosis.

Rare granulomatous areas, some of which contained acid-fast bacilli, were also found on routine examination of sections taken from the liver and spleen, but none were found in other organs.

Comment.

The interesting question with this patient is, why did she suddenly develop fulminating tuberculosis after living to the age of 85 years apparently free from the disease? Presumably, the grave upset of physiological balance at the time of the strangulation of her incisional hernia was the precipitating factor which allowed a latent infection to reactivate.

Case II.

Baby B. was born two weks prematurely, the twelfth child in the family. Sixteen days later he developed severe pneumonia and was admitted to hospital. He was given chemotherapy, but his condition deteriorated, and he was transferred to the Queen Victoria Hospital on his twenty-first day. When admitted he was gravely ill. Nose and throat swabs yielded a heavy growth of *Staphylococcus aureus*, and an X-ray examination of the chest revealed widespread mottling. Staphylococcal pneumonia was diagnosed. In spite of treatment the baby died 23 days after birth.

At autopsy, all lobes of both lungs were thickly studded with small, yellow nodules 1 to 2 mm. in diameter. The tracheo-bronchial lymph nodes were enlarged and the spleen was very firm, but otherwise all viscera appeared normal on macroscopic examination.

On microscopic examination, the lungs showed a severe pneumonic reaction, the alveoli being packed with exudate containing large numbers of macrophages, some polymorphs and some lymphocytes. The reaction was unlike that of suppurative pneumonia, but it was not until Ziehl-Neelsen staining showed masses of acid-fast bacilli that the tuberculous origin of the infection was recognized. Acid-fast organisms were demonstrated in the lungs, the tracheo-bronchial lymph nodes and a single nodule in the spleen, but not on routine examination of sections of other organs.

Some time after the baby's death, information was received from another hospital that the child's mother had been admitted and diagnosed as suffering from miliary tuberculosis. The history of this pregnancy is as follows. The patient had had no chest illness until about the fifth month of this pregnancy, when she developed a febrile illness with pleural effusion. The pleural fluid was sterile on culture. She improved slowly, and was reasonably well at delivery. She did not breast feed the baby, but was

in daily contact with him till his sixteenth day. After delivery the mother did not make a good recovery; the lochial discharge persisted, the pleural effusion recurred and her general health deteriorated. Six weeks after delivery she was transferred to a Melbourne hospital. X-ray examination of the chest showed scattered nodular shadows in both lungs, and the vaginal discharge contained acid-fast bacilli. Examination of a sputum smear failed to reveal acid-fast bacilli, but subsequently the sputum yielded a positive culture. The patient was given anti-tuberculosis chemotherapy and transferred to a sanatorium, where she made a good recovery.

Investigation of the immediate family gave the following results. The husband was Mantoux-positive, but an X-ray examination of his chest showed no abnormality. Ten children were Mantoux-negative; the eleventh was not Mantoux tested, but the X-ray film of his chest was clear.

Comment.

The problem of particular interest here is, how did the baby contract his fatal disease? The mother was infected and had been in contact with the baby, so that this seems the most likely mode; but from the history it is impossible to say when the mother became infectious. The clinical course suggests rather that this infection developed some time after delivery. If active disease of the uterus had been present at the time of delivery, inhalation of tubercle bacilli by the baby during his passage through the birth canal might be possible. Transplacental infection of the fœtus, either during the stage of bacteriæmia when the original pleural effusion occurred, or at some later date when the mother's disease was disseminated via the blood-stream, must also be considered. With all these possible modes of infection of the child, the lungs could be the chief site of damage in the baby. Most authorities will not accept intrauterine infection as a possibility if there has been contact with an infectious person after birth.

It seems most likely that the mother developed miliary tuberculosis in the later part of pregnancy or very early in the puerperum, and that she was the source of the baby's disease by direct contact.

Discussion.

Both these patients had severe illness. In the elderly patient, the outstanding finding was cardiac enlargement, which at her age is rarely due to an acute infective process. This, together with the facts that she had little fever and no radiological evidence of pulmonary disease, makes it easy to understand why tuberculous infection was not suspected.

A fulminating pneumonic illness in a newborn child, from whose nose and throat pathogenic staphylococci have been cultured, is almost certain to be of staphylococcal origin. With no family history of tuberculosis, it is not surprising that the tuberculous origin of this baby's pneumonia was not suspected during his life.

Acknowledgements.

I wish to thank the private practitioners who referred these patients for furnishing clinical details and my colleagues in the Victorian Health Department for family and maternal follow-up details in Case II.

Reviews.

The Premature Baby. By V. Mary Crosse, O.B.E., M.D. (London), D.P.H., H.M.S.A., D.(Obstet.)R.C.O.G.; fourth edition; 1957. London: J. and A. Churchill, Limited. 8½" x 6", pp. 242, with 39 illustrations. Price: 20s.

A NEW EDITION of Dr. Crosse's book on the premature baby is an important event in obstetrics and pædiatrics.

Every aspect of the problem of the successful care of the premature baby is dealt with in detail. Advice is given to the obstetrician, to the hospital administrator, to obstetric nurses and to medical practitioners engaged in general practice, to pædiatricians and to public health authorities, from Dr. Crosse's wealth of experience in all fields of care.

The chapter on characteristics is invaluable. In explicit terms Dr. Crosse places before all those undertaking the care of premature babies the fundamental fragility of the premature baby, pointing out clearly the physiological status of each system according to the immaturity of the individual baby. This approach in turn is complemented by positive advice in later chapters on the way in which to combat the problems presented by these imperfections.

The significance of successful care of premature babies is highlighted by the comprehensive statement on vital statistics. This leaves no doubt of the national importance of the care of the premature baby, and shows that no effort should be spared to provide adequate facilities and expert supervision for these babies. These figures also set out clearly the responsibility of the obstetrician. The nature of this responsibility is also emphasized in earlier chapters referring to the conduct of labour.

Those complications likely to occur in premature babies are all dealt with in the customary efficient manner of this world expert. Susceptibility to infection and the reduction of the incidence of infection are given the importance required for the battle against staphylococcal infection. The references to hæmorrhagic and hæmolytic diseases, kernicterus, etc., are succinct and clear, as also is the advice on their prevention and treatment. In addition the survey of symptoms—cyanosis, œdema, vomiting, etc.—and their significance is particularly helpful and practical.

Dr. Crosse has increased the indebtedness of the medical profession to her for sane guidance and detailed advice on this subject.

Surgery in Infancy and Childhood: A Handbook for Medical Students and General Practitioners. By Matthew White, M.A., M.B., Ch.B., F.R.F.P.S., F.R.C.S., and Wallace M. Dennison, M.D., F.R.F.P.S., F.I.C.S.; 1958. Edinburgh and London: E. & S. Livingstone, Limited. 8½" x 5½", pp. 456, with 226 illustrations. Price: 45s. (English).

PÆDIATRIC SURGERY has been recognized as a specialty more and more in recent years in English-speaking countries, and a great deal of literature dealing with the specific problems relating to surgery in infants and children has appeared in surgical and medical journals; but until recently no textbooks have been available for teaching.

The problem facing the present authors in producing such a book has been to compress a very large subject into 450 pages. From a wealth of clinical material obtained in a unit where pædiatric surgery has been an important specialty for over 30 years, they have been able to cover most of the conditions encountered in infancy and childhood. No words have been spent in details of surgical treatment or in discussing controversial hypotheses regarding the ætiology of congenital abnormalities; but definite statements concerning diagnosis and treatment have been made. With these most pædiatric surgeons would agree. The authors do not set out to produce a reference book, and details of surgical technique will not be found; but most pædiatric surgeons will find something of interest and profit.

Orthopædic problems, including congenital abnormalities and fractures, are dismissed in the space of about 60 pages, much of which is taken up with illustrations, so that these are treated too superficially to be of much value. It might have been better to omit fractures altogether, and also rare congenital abnormalities which better illustrate an atlas than a handbook.

However, the authors have faced a most difficult problem in deciding what to include and what to omit. They have succeeded admirably in producing a very valuable, concise and informative book for medical students and general practitioners. It is freely and well illustrated with excellent photographs and line drawings, and supplies a definite statement, however brief, on most pædiatric conditions.

Whillis's Elementary Anatomy and Physiology. By Roger Warwick, B.Sc., Ph.D., M.D.; fourth edition; 1957. 9¼" x 6½", pp. 288, with 107 illustrations. Price: 22s. 6d. (English).

THE task of writing an "elementary" book on any factual subject is always a difficult one; but when two basic sciences are incorporated in a single volume of only 274 pages, the task if complicated becomes a feat. This feat has been accomplished magnificently by the late Professor Whillis in a book which has now run to its fourth edition revised by his successor, Professor R. Warwick.

This book should be of the greatest use to the nursing profession, although it was originally intended as an introduction for students studying for the Medicine II examinations. The brief allusions to clinical applications of anatomy and physiology will find a welcome awaiting them by the sister tutors of the nursing schools.

The section on muscle work and skeletal dynamics (page 64) is particularly suitable for physiotherapists and physical educationists; but it is doubtful whether medical students in the dissecting room will attach much importance to levers of the first, second and third order. Yet the varieties of muscle activity are well described, for all too often are the functions of prime movers, synergists, antagonists and fixation muscles neglected. While the mechanism of maintaining the erect posture is well described and illustrated, we believe that more emphasis should have been placed upon the work done by the sacro-spinalis complex and its antagonists in this respect. Again, if the mechanism of the bipedal walk is to be included, surely the synchronous actions of the upper limb girdle must find a place in human locomotion, and no distinction is drawn between walking and running.

The book is well and generously illustrated with 107 line drawings, which correspond to the text description; but Figure 20 reveals the scalenus anterior as a muscle of the posterior triangle, and Figure 50 depicts an abnormally displaced gall-bladder in relation to the greater curvature of the stomach. The nerve supply of the skin of the head and neck is included, and it is a pity that the segmental innervation of the limbs and trunk has not also been illustrated.

Professor Warwick is to be congratulated on blowing away some of the clouds forming around nomenclature, for he has listed the synonyms of B.N.A. and I.A.N.C.

Surgery of the Colon. By E. S. R. Hughes, M.D., M.S. (Melb.), F.R.C.S. (Eng.), F.R.A.C.S.; 1959. Edinburgh and London: E. & S. Livingstone, Limited. 9¾" x 6¼", pp. 424, with 234 illustrations. Price: 63s. (English).

BASICALLY this is a good book, and its preparation has obviously involved a wide search of the literature, which is extensively quoted. The author himself has had a large personal experience, and he has based the volume on the results of his own observations.

The over-all criticism of this book is that there is far too much padding in it; by exclusion of the many irrelevencies and a reduction in the number of illustrations, the contents could be combined with the author's earlier work of three hundred odd pages on "Surgery of the Anus, Anal Canal and Rectum" to make a most useful and authoritative presentation. It is impossible to discuss the surgery of the colon and of the rectum in separate books without overlapping and a deal of repetition. The main irrelevancies are in the earlier chapters, and a number of remarks and photographs in the chapter on constipation could well be excluded in a work of this character. The account of the bowel habits of a French ruler and his ladies, with photographs of the ibis and of native customs, should not concern the readers of a book at this level—they would be more interested in some fuller details in the later chapters. The best section is that covering ulcerative colitis, which is well done.

So far as technical details are concerned, the author appears to prefer open anastomoses, as do most surgeons today; but there are occasions when closed methods have their place. Some further description of the Paul-Mikulicz operation and its later management would have been desirable, for, as the author admits, there is still some place for this operation. Undue emphasis on the non-operative management of volvulus may mislead less experienced men, and again the author has failed to draw attention to the significance of the small areas of necrosis in the wall of the twisted loop which lead to perforation if not oversewn. The practice of draining the operative area through the main wound is not a good one, as it can be conducive to wound infection and incisional hernia.

The publishers deserve full credit for their work, which is in keeping with their best standards, and the editing has been thorough, although the not uncommon error in the spelling of "Halsted" has slipped through.

Cryptorchism. By Charles W. Charny, M.D., and William Wolgin, M.D.; 1957. New York: Paul B. Hoeber, Incorporated. 9¼" x 6", pp. 152, with 28 illustrations. Price: $5.85.

THIS is the best monograph to date on the difficult and controversial subject of undescended testicle. It is built around the added investigation of testicular biopsy as a guide to the study of the undescended testicle, both in its development in an abnormal site and in its subsequent progress after treatment, whether by operation or by hormone therapy.

The material studied has been logically and clearly presented, the views of various authorities being stated and the authors' own conclusions being also added. Each of the seven chapters ends with an excellent summary; they deal respectively with embryology, the mechanism of descent, ætiology, pathology, symptoms and complications, diagnosis and treatment, and evaluation of the results of treatment including a review of literature (which is probably the most important chapter of all). References are clearly noted, and each chapter concludes with a detailed bibliography. The photomicrographs are beautifully reproduced, and their captions are unusually informative.

In spite of this many questions remain unanswered. For instance, what is the actual cause of failure of descent? And does the spermatogenic inadequacy of the undescended testicle depend on a congenital deficiency, or is it due to the effect of the unfavourable environment?

Testicular biopsies have indicated progressive degeneration of non-scrotal testicles, but they have also shown that little histological difference exists before the age of ten years between the testis in the scrotum and that outside, whether retractile, ectopic or in the line of descent. This suggests that operation earlier than that age may be unnecessary. There have been those who advocate operation before the age of two, and even as soon after birth as possible.

The authors stress the danger of bilateral testicular atrophy from overdosage with hormones, and consider that hormone therapy is of little value, apart from differentiating testicles which will or will not descend without operation. However, they also take a very pessimistic view of the results of operation, quite correctly emphasizing the fact that placing a testicle in the scrotum does not necessarily indicate a good result. The aim is adequate spermatogenesis.

This book should be in every children's hospital library at least.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Bedside Diagnosis", by Charles Seward, M.D., F.R.C.P. (Edin.), with a foreword by Lord Cohen of Birkenhead, M.D., D.Sc., LL.D., F.R.C.P., F.A.C.P., F.F.R.; Fifth Edition; 1960. Edinburgh and London: E. and S. Livingstone Ltd. 7¼" x 5", pp. 500, with illustrations. Price: 25s. (English).

"On the Causation of Varicose Veins and their Prevention and Arrest by Natural Means: An Evolutionary Approach", by T. L. Cleave, M.R.C.P. (Lond.), with a foreword by Harold Dodd, Ch.M., F.R.C.S.; 1960. Bristol: John Wright and Sons Ltd. 7¼" x 4¾", pp. 32. Price: 7s. 6d. (English).

"Leukæmia: Research and Clinical Practice", by F. G. J. Hayhoe, M.A., M.D. (Cantab.), M.R.C.P. (Lond.); 1960. London: J. and A. Churchill Ltd. 9½" x 7", pp. 346, with 12 coloured plates and 196 black and white illustrations. Price: 80s. net (English).

"Health Services in the U.S.S.R.: Report Prepared by the Participants in a Study Tour Organized by the World Health Organization", World Health Organization Public Health Paper No. 3; 1960. Geneva: World Health Organization. 8½" x 5½", pp. 58. Price: 3s. 6d. (English).

"Medical Department, United States Army, Surgery in World War II: Neurosurgery"; Volume 2. Prepared and published under the direction of Major-General S. B. Hays. Editor-in-Chief: Colonel John Boyd Coates, jnr., M.C. 1959. Washington, D.C.: Office of the Surgeon-General, Department of the Army. 9¾" x 6", pp. 737, with many illustrations and tables. Price: $7.00.

"Bibliography of Cancer Produced by Pure Chemical Compounds: A Survey of the Literature up to and including 1947", by Otto Neubauer, M.D.; 1959. London and Melbourne: Oxford University Press. 9" x 6", pp. 632. Price: 68s.

"The Merck Index of Chemicals and Drugs: An Encyclopedia for Chemists, Pharmacists, Physicians, and Members of Allied Professions", edited by Paul G. Stecher; Seventh Edition; 1960. Rahway, N.J., U.S.A.: Merck and Company, Inc. 9¾" x 7", pp. 1656. Price not stated.

The Medical Journal of Australia

SATURDAY, JUNE 25, 1960.

MEDICAL RESEARCH IN AUSTRALIA.

A RAPID increase is taking place in both the amount and the significance of medical research in Australia, and it is an accelerating increase. Up till only a few years ago the amount of research that really mattered in clinical medicine and in the medical sciences was small in this country, and most of it came from a few acknowledged centres. This has changed. Existing research institutes have expanded, and new institutes have been founded; clinical research units have been developed; new medical schools have come into being, new chairs have been created in the older schools, and this has resulted in the importation from overseas of young men with vigorous and able minds, and in a welcome slackening of the urge that many of our own best men have had to seek permanent posts overseas. Behind these developments in turn has been the expansion in activities and resources of existing grant-making bodies together with the establishment of new foundations.

This growth is encouraging to our young country, especially in view of our isolation, which has not been abolished although it has been lessened by modern means of transport and communication. Australia is in a position to make an increasing contribution to medical knowledge, and there is less need to go overseas to find scope for talent. However, it is not enough to have a multiplication of facilities and an increase in quantity of research activities. The highest possible standard must be aimed at, and now is the time for careful stocktaking to ensure that we do not drift into well-meaning but wasteful expansion and encouragement of the mediocre. Important aspects of the question are the provision and allocation of funds, the coordination and direction of research, and the publication of results.

Funds for medical research in Australia come from a variety of sources—from governments through universities, research institutes or such grant-making bodies as the National Health and Medical Research Council; from other sources at the disposal of universities and institutes; from the various foundations and similar bodies; and from private donors, not the least of whom are the pharmaceutical firms. The flow from most of these sources has increased appreciably. The Federal Government, it is encouraging to note, has shown a greater appreciation of the need, and we hope that it will see its way clear to support fully all the work for which it is responsible. Certain of the foundations have held vigorous fund-raising campaigns in recent years, with great success in some cases and a somewhat disappointing response in others, but a great deal of money has become available for research through their efforts. Private donors are perhaps not so generous as they were in a day when there was less levelling down of incomes and less sense of dependence upon government support for public causes and institutions, but there are still individuals who show great generosity, and the response of the ordinary citizen to special appeals can be staggering. All in all, there is much by which to be encouraged in the matter of financial resources. Moreover, there is little to suggest that available funds are being distributed other than conscientiously or that research activities in the various centres are not being carefully planned and carried out.

The question that is exercising many thoughtful people, a question raised earlier this year in a letter by Sir Macfarlane Burnet,[1] is whether the present pattern is sound for the future, and indeed whether it is an orderly pattern at all. There is considerable diversity of funds and of research activity with little coordination or over-all control. Certainly lack of coordination is to be deplored. Workers in particular medical research centres have confessed freely that they do not always know what is going on elsewhere in Australia, even in aspects of research allied to their own; and with various grant-making bodies allocating their funds independently, there is every reason to fear that wasteful and pointless duplication may occur. Just what deliberate coordination measures are feasible or desirable requires much sober thought, especially if the question is linked with that of control of funds and direction of research. Burnet's letter appears to envisage a considerable measure of over-all control of basic research and, with some qualifications, of clinical research, and perhaps this is how it will have to be, though everybody will not agree with the idea or the ways in which it is suggested that it might come about. Difficulties can be readily foreseen or imagined in the sort of curtailment of individual freedom involved. Donors and foundations will not lightly put aside their desire to have a say in the disbursement of their money. The channelling of funds through too restricted a body could mean the stifling of capable workers who were not orthodox in terms of the views of the controlling body—or perhaps (indeed, probably) the views of the particular member of the controlling body interested in the field of investigation concerned. And so on. It may be, and some will certainly contend it, that these objections are straw-men, but the subject does bristle with difficulties. This does not mean that Burnet's letter and views are to be brushed aside. Any suggestions that are offered in this field will be severely handled by someone. Burnet's views have qualified for criticism chiefly by the fact that he has had the courage to put them on paper. By the same token it is disappointing but not altogether surprising that more people who are informed and interested in this matter have not joined in the correspondence. The airing of views in an open forum would be helpful and salutary. Meantime we shall hope to hear more of the request of the Medical Research Advisory Committee of the National

[1] MED. J. AUST., 1960, 1: 149 (January 23).

Health and Medical Research Council, referred to in a letter by its chairman, Dr. W. F. Simmons,[2] that the Prime Minister should invite Sir Harld Himsworth, Secretary of the Medical Research Council of Great Britain, to visit Australia and advise the Commonwealth Government on the organization and financial needs of medical research in Australia.

In relation to the problem of coordination of medical research, and in an attempt to assist in its solution, we publish elsewhere in this issue (see page 1034) a list of research projects for which grants have been recently made. The list is not complete, despite the ready and interested response of many of the bodies approached, but it is a start. The information should be fuller next time. We have not intentionally failed to include any grant-making body that might be interested, and constructive comment will be welcomed if it will help to provide the information that is needed. If the list, for the idea of which we are indebted to Dr. T. E. Lowe of Melbourne, is generally thought to be useful, an attempt will be made to make it comprehensive. This will probably make it too large for the pages of the Journal, but it should not be impossible to devise some other means of presenting it.

The last aspect of the subject that calls for stocktaking is the publication of the results of medical research in Australia. This will be very much in the minds of those who attend the Conference on Medical Journalism to be held in Sydney in October (see page 1046) under the sponsorship of the Post-Graduate Committee in Medicine in the University of Sydney. The idea of the conference is to bring together editors and others concerned with the production of existing medical journals in Australia, so that, in company with genuinely interested members of the contributor-reader group, they may scrutinize medical journalism as it is in this country, with an eye to influencing its future development along the most useful lines. It is to be sincerely hoped that, as a major outcome of the conference, the Australian medical Press of the future will provide a worthy and acceptable vehicle for the transmission to the world of the results of sound and increasingly attractive Australian medical research.

Current Comment.

MONKEY INTO SPACE.

IT is now almost three years since Russian scientists startled the world and outraged dog-lovers by sending Laika into orbit round the earth. She did not, of course, return to wag her tail, but the Russians state that they have sent other animals on rocket trips into space, and returned them safely to earth, and thereby they have no doubt collected much information of value in planning for the ultimate project of sending man into space. However, this information is not easily available to medical readers in the Western world.

The Russians are believed to have a substantial lead in the science of rocketry, but the Americans are also putting out a big effort in this direction, and the successful flight of two monkeys into space and their safe return to earth in May of last year has received considerable publicity. A detailed account of this and a preceding flight has now been published, with commendable promptitude.[1]

In the first flight the opportunity arose of including a "passenger" in the nose cone of a rocket, the recovery of which was to be attempted. This opportunity for a "bio-flight" was incidental to the main purpose of the experiment; the space available was 750 cu. in., and the weight was limited to 30 lb. These limitations were important in determining the choice of passenger. The species selected was the squirrel monkey (*Saimiri sciurea*), young individuals of which weigh between 300 and 500 grammes. The elaborate preliminary preparations necessary are briefly described. These included selection tests to find an individual which would tolerate prolonged confinement, and then an adaptation course of training. For the actual flight the animal was confined in a cylinder measuring 11 in. by 3 in. and placed with all the paraphernalia necessary to ensure control of temperature and humidity, and to provide for a proper supply of oxygen and the absorption of carbon dioxide, in what the authors term the biocapsule. This must be sealed to withstand changes in external pressure ranging from zero to several atmospheres (the intention being to recover the capsule from the ocean), without alteration in its internal pressure. Furthermore, continuous information was to be transmitted on four aspects of the animal's physiology—temperature, respiration rate, electrocardiogram and chest sounds. The electrocardiographic electrodes were implanted subcutaneously before the animal was placed in its cylinder.

All this was complicated by the fact that the biocapsule had to be placed in position several hours before the actual flight, though this lasted only some 15 minutes. In this brief interval the nose cone containing the biocapsule and other instruments was projected to a height of approximately 300 miles above Earth's surface. In the first "bio-flight" physiological data transmitted were clearly recorded, and indicated survival in good condition until the re-entry of the nose-cone into the earth's atmosphere, when the signals failed, and nothing is known of the subsequent fate of the nose-cone or its contents.

However the experience so gained was used to plan a second, more ambitious "bio-flight"; on this occasion considerably more space was allocated for the biological part of the experiment. For this flight two monkeys were selected as passengers, one a rhesus monkey, the other a squirrel monkey as before. For the rhesus monkey it was arranged to transmit no less than six sets of physiological data, the two additional recordings being electromyograms to obtain the potentials generated by muscular action of the animal. Arrangements were also made to obtain a cinematographic picture of the animal during flight. Only one transmitting channel was available for the squirrel monkey, and this was used to relay its electrocardiographic tracing. A complication of the arrangements for the rhesus monkey was that it had to be placed in its capsule in the nose-cone 64 hours before the take-off, confined in a prone position. Two separate systems had therefore to be included, one to control the atmosphere, temperature and humidity from outside before take-off, and the other, completely self-contained, for use during the actual flight and for some hours immediately before and after. The monkey was nourished by the intraperitoneal infusion of 5% dextrose solution given slowly in 5 ml. doses once every hour. To help with the problem of sanitation the monkeys were fed on a constipating diet of raw peanuts for a period before the flight.

This second "bio-flight" was almost completely successful; some of the measurements for which provision was made were not obtained, but most of the hoped-for data were successfully recorded and gave a relatively comprehensive picture of the physiological reactions of the animals during the flight. The capsule was recovered from the sea about two hours after impact, and both monkeys were found to be alive and in apparent good health. They were first flown to the Walter Reed Army Institute of Research, where a total body radiation count was made, and thence to the Army Medical Research Laboratory at Fort Knox, where the electrocardiograph electrodes were to be removed. Unfortunately, while under general anæsthesia for this simple procedure, the rhesus monkey died. One

[2] MED. J. AUST., 1960, 1: 231 (February 6).
[1] *Aerospace Medicine*, 1959, 30: 871 (December).

of our correspondents has suggested[2] that this was an example of the workings of autonomic dyspraxia. However, post-mortem examination did not reveal any evidence of injury. Its companion, the delicate squirrel monkey, became very tame during its travels after its space-flight, and was still in good health at the time the report was written.

Anyone interested in the details of technique and of the physiological results obtained is recommended to consult the original report. At the end of it, the authors append a list of some of their outstanding impressions gained from it. Some of these are as follows: (i) the prodigious effort which went into the collection of relatively few data; (ii) the almost innumerable opportunities for human error and material failure, and the feeling that it is a minor miracle if all arrangements work out satisfactorily; (iii) the high standards of bio-technical equipment and skills required; (iv) the need for additional experimentation with missiles and animals before man can be sent into space.

THIRTEENTH WORLD HEALTH ASSEMBLY.

A BUDGET of $18,975,354 for the World Health Organization programme of work for 1961 has been approved by the thirteenth World Health Assembly which ended its three-week session in Geneva recently. The largest single item in the new budget, outside of the WHO special fund for malaria eradication, is for the eradication of communicable diseases. An amount of $200,000 was added by the Assembly to the WHO Director-General's budget proposal to finance additional assistance for new members and Associate members. The budget also provides for assistance in many other aspects of public health as well as for central technical services, epidemiological intelligence services, health statistics and standardization of drugs, and for the Organization's extensive list of publications.

The session was attended by delegates from 96 of the 101 member and associate member States of WHO. Dr. H. B. Turbott, Director-General of Health of New Zealand, is the President of the Assembly. A variety of topics received attention.

The Assembly expressed satisfaction with the technical achievements of the world-wide malaria eradication campaign but, on the financial side, stated that the stage had been reached when the financing of eradication operations through the Malaria Eradication Special Account on a voluntary basis was not possible without the full support of all the economically more privileged countries of the world. It was decided to establish an official register listing areas where malaria eradication had been achieved, after inspection and certification by a WHO evaluation team.

Progress was reported towards the goal of the eradication of smallpox; the number of cases in 1959 was considerably less than in 1958. India and Pakistan were still seriously affected by smallpox, but India had started a number of pilot projects for control, and Pakistan was showing active interest in the matter. The danger of reintroducing the disease, from existing foci of infection, into countries which had been freed from it, was constantly emphasized during the discussions on this subject. Two governments offered gifts of smallpox vaccine to aid the campaign.

The Assembly defined the role of WHO in radiation health to include the protection of mankind from ionizing radiation hazards, whatever their source, and the development of medical uses of radiation and radioactive isotopes. It was deemed necessary to emphasize the need for teaching and training of technical personnel of member countries and to assist those countries to accept their responsibilities and accelerate their activities in the public health aspects of radiation from all sources.

The necessary legal action was taken by the Assembly to authorize the construction of a new headquarters building for the Organization in Geneva, at a cost not exceeding 40,000,000 Swiss francs. The Director-General was asked to conclude an agreement with the Swiss Confederation and with the Canton of Geneva, and to arrange for the necessary contracts with the architect, builders and suppliers.

The invitation of the Government of India to hold the fourteenth World Health Assembly in New Delhi in February, 1961, was accepted. India will meet $250,000 of the extra costs involved.

Other decisions taken by the Assembly included the indefinite postponement of a World Health Year; it was considered that the Organization could not afford to divert funds and personnel from urgently needed health campaigns. The programme for an intensified programme of medical research was endorsed by the Assembly, and the necessity for training qualified personnel essential to its execution was firmly underlined.

The technical discussions this year dealt with "The Role of Immunization in Communicable Disease Control"; from these it was concluded that smallpox vaccination still held first priority in the world, despite the varying epidemiological picture presented by different countries.

Three new members and eight new associate members also attended the session. They are Cameroun, Kuwait and Togoland, and Cyprus, Central African Republic, Republic of the Congo, Republic of the Ivory Coast, Gabon Republic, Republic of the Upper Volta, Republic of the Niger and the Federation of Mali. Six countries were elected to designate a person to serve on the WHO Executive Board. They were Ghana, Thailand, Jordan, Korea, United Kingdom and Argentina. The 12 other members of the Board are from the following countries: Brazil, France, Guatemala, Iran, Ireland, Luxembourg, Nepal, Peru, Sudan, USSR, Venezuela and Viet Nam. The Assembly also requested the Director-General to take the necessary steps on behalf of the WHO in relation to the League of Arab States, with a view to concluding an agreement to define the sphere of cooperation in health fields.

MARRIAGE AND DIVORCE.

POPULAR thinking presupposes that there are normal and neurotic persons. According to this view a good and stable marriage exists when two normal persons marry; if one or both are neurotic, then the outcome depends on the reciprocal relationship between their symptoms. If these dovetail (as, for example, when sadist and masochist marry) a workable marriage will result, but at a price; if they do not, divorce is a likely and frequent outcome. An American psychiatrist, M. H. Hollender,[1] believes that this concept has two major defects. The first is the assumption that normality exists or that a hypothetical state of normality provides a useful point of anchorage. With so-called normal individuals there may be a failure of matching in terms of aspirations, values, etc., as well as a poor fit in terms of emotional needs. The second false assumption is that there are neuroses, and the author emphasizes that these are only abstractions.

He proposes an alternative scheme, based on "problems in living" (which affect all people and not only some as implied by the term neurosis), which is unambiguous, experiential and non-judgemental in emphasis. Those with reciprocal problems in living have a stable marriage so long as the dovetail is maintained; those with clashing problems will have a stormy course, a marriage in name only or divorce. He believes that the value systems of the participants must be considered also. The goal in therapy may be to preserve marriage, or to deal with individual problems without regard for their effect on marriage. The marriage-focused therapist must recognize that he is espousing society's value systems; this approach would preclude the possibility of psychoanalytical therapy, which is possible only if treatment is person-orientated. An analyst should be as aware of his cultural bias as much as he strives to be aware of his counter-transference.

[2] MED. J. AUST., 1959, 2:28 (July 4).

[1] *A.M.A. Arch. gen. Psychiat.*, 1959, 1:657 (December).

Abstracts from Medical Literature.

PÆDIATRICS.

Pulmonary Hyaline Membranes.

S. BUCKINGHAM AND S. SOMMERS (*A.M.A. J. Dis. Child.*, February, 1960) state that resorption atelectasis with pulmonary hyaline membrane formation is a leading cause of neonatal death in the United States, both its cause and pathogenesis remaining obscure. The lungs of 25 infants with hyaline membrane disease were studied histologically and in part by ultra-violet microscopy. Hypersecretory changes occurred in the terminal bronchioles and alveolar lining cells. These studies confirmed other investigations that have shown hyaline membranes to consist of various substances such as cytoplasmic components, hæmoglobin, fibrin in various stages of polymerization, nucleoprotein and mucoprotein. This work supports the belief that the respiratory epithelium actively participates in the formation of hyaline membranes rather than acting merely as a conduit through which plasma enters the alveoli. Experimental pulmonary hyaline membrane formation was studied in mice with use of high oxygen concentrations and various pharmacological agents that may be related to suspected pathogenic mechanisms. Mice were found to be resistant to concentrated oxygen but showed an enhanced response and many hyaline membranes after atropine, "Compound 48/80", pertussis-sensitization, and cortisone. Tryptamine did not confer protection against membrane formation in these experiments. The authors conclude with the suggestion that the secretory products of the respiratory and alveolar epithelium participate in the formation of the hyaline membranes and that these changes may reflect autonomic nervous system dysfunction.

Chronic Lead Encephalopathy.

H. WHITE AND F. FOWLER (*Pediatrics, February, 1960*) report a case of chronic lead poisoning occurring in a child who presented, not with the classical signs and symptoms of lead encephalopathy, such as convulsive seizures and signs of increased intracranial pressure, but instead with the picture of a behaviour disorder associated with progressive dementia. They point out that it has been suggested that particular attention should be given to lead poisoning in patients with signs and symptoms suggestive of schizophrenia, infantile autism, amentia, educational subnormality, hyperkinetic behaviour and other behaviour disorders. Not infrequently, cases are incorrectly diagnosed as having primary behaviour disorders, brain tumours or epilepsy. The case reported by the authors exhibited all of the characteristics described as behavioural and mental symptoms, but vomiting was the only systemic manifestation noted. The chemical diagnosis of lead poisoning is made by demonstrating increased amounts of lead in the serum or blood, or in a twenty-four-hour urine specimen. However, such tests have little value as a screening procedure. Determination of urinary coproporphyrin is a simple, fast screening procedure, applicable to office practice. The prognosis for normal mental development after encephalopathy has developed is poor. It is hoped that early recognition of the more subtle signs of central nervous system involvement will allow treatment to be instituted soon enough to prevent the crippling mental deterioration which is so often a sequel of lead poisoning.

Visceral Larva Migrans Causing Severe Myocarditis.

S. FRIEDMAN AND A. HERVADA (*J. Pediat.*, January, 1960) review the clinical syndrome characterized by fever, hepatomegaly, leucocytosis and marked eosinophilia, and hyperglobulinæmia. These pathological changes have been shown to result from a parasitic infection with the larval form of a nematode commonly found in dogs (*Toxocara canis*) and cats (*Toxocara cati*), to which the name visceral larva migrans has been given. The ova of this parasite are passed in the fæces of infected dogs and cats and contaminate the soil. Under favourable circumstances of temperature and humidity, the ova may become embryonated and, if ingested, pass through the stomach of the human host and hatch in the small intestine. The larvæ penetrate the intestinal wall and migrate via the blood stream or lymph passages to the liver, lungs and other organs. The authors then describe a Negro girl aged two and a half years with visceral larva migrans in whom severe myocardial involvement occurred, followed by complete recovery. The symptoms of congestive heart failure responded favourably to the conventional symptomatic measures employed for this purpose. In this patient these consisted of the use of digitalis, mercurial diuretics, oxygen, and a low-salt diet. Two episodes of bronchitis and pneumonia responded dramatically to adrenal steroid therapy in moderately large doses. Considerable improvement in the patient's cardiac condition had already occurred as a result of symptomatic measures so that no evaluation of the effect of steroids alone upon the heart disease could be made. However, by analogy with the favourable response of the pulmonary involvement, it seems logical to try adrenal steroid therapy in patients with myocardial involvement due to *Toxocara* infection if the usual symptomatic measures fail to result in improvement.

Amino Acids as Dietary Supplements.

C. D. MAY (*Pediatrics*, February, 1960) comments on the place of amino-acid supplementation in practical human nutrition, which has attracted the attention of scientists and commercial enterprises. Quoting a report of the Committee on Amino Acids of the Food and Nutrition Board, National Research Council, he states that in the United States the danger of adverse affects from supplementation of diets or fortification of foods with amino acids should not be over-emphasized. Harm is likely to occur only when a considerable excess of a single amino acid is fed, or if amino acids are added to diets that happen to be deficient in other respects (e.g. vitamins), or if a diet deficient in several amino acids is supplemented with amino acids other than the ones most lacking. In practice, the levels of single amino acids that could be rationally recommended as supplements are not likely to be excessive. Although the report of the Committee leaves little reason to fear adverse effects from the quantity of lysine provided by supplements still being advertised, for addition to the diets of infants and children to stimulate growth and appetite, no significant evidence was found that amino-acid supplementation is generally needed in the United States. It is more desirable to supply an adequacy of good quality protein in preference to amino-acid supplements. In disease states supplementation of the diet with individual amino acids may be beneficial, but this is a different matter without relevance to the nutrition of normal individuals.

Peptic Ulcer in Children.

A. RAMOS *et alii* (*A.M.A. J. Dis. Child.*, February, 1960) review the literature and report 32 cases of peptic ulceration in children, four with acute and 28 with chronic peptic ulcer. They state that despite its relative infrequency, peptic ulcer is not uncommon in children. Chronic peptic ulcer is the main clinical problem in children, as well as in adults, its incidence increasing proportionately with age. It occurs predominantly in males and with a definite preponderance of duodenal over gastric ulcers at all ages. The younger the child, the more vague are the symptoms and signs. In approaching puberty the clinical picture more closely resembles the adult symptomatology. Chronic abdominal pain is the prominent symptom. Since abdominal pain is one of the commonest childhood complaints and is caused by many disorders, a high index of suspicion for ulcer is necessary in initiating studies for peptic ulcer. Abdominal pain may be atypical in location, presentation, duration, or relation to food intake or alkali, but chronicity remains its outstanding feature. The radiological examination of the stomach and duodenum is the most important diagnostic procedure in the recognition of peptic ulcer in children. Medical management, with avoidance of gastro-intestinal irritants in food and medication, frequent antacids and sedation, is effective in the majority of children. As in the adult, surgical management may be necessary in childhood peptic ulcer complicated by hæmorrhage or perforation, although these complications are not as common among children as is often supposed.

PSYCHIATRY.

Comparative Pharmacology of Some Psychotropic Drugs.

E. JACOBSEN (*Bull. Wld Hlth Org.* volume 21, number 4–5, 1959) reviews the literature on the behaviour of some of the better known compounds which affect the higher functions of the central nervous system. He points out that the diversity of psychic and somatic effects produced by these drugs, the fact that

they may have similar effects on some functions but opposite effects on others, and the lack of a precise and universally accepted terminology to describe these properties, have led to much confusion and thwarted attempts to arrive at a satisfactory classification. He has summarized their pharmacological actions under the following headings: general effects, gross behaviour (spontaneous activity, catalepsy, paralysis, anæsthesia, convulsions), synergism or antagonism, effect on lower centres, effect on the extrapyramidal system, electroencephalographic changes, effect on higher psychic functions in animals and in man, and basic actions of possible importance. The drugs considered are reserpine, chlorpromazine, diphenylhydramine, hydroxyzine, pentobarbitone, phenaglycodol, meprobromate, mephenesin, benactyzine, azacyclonol, pipradol, amphetamines, mescaline, and lysergic acid diethylamide. A classification of these compounds proposed by the W.H.O. study group is summarized, and compared with six other classifications. The drugs are divided into major and minor tranquillizers, tranquillo-sedatives, hypnosedatives, centrally acting anti-acetylcholine drugs, stimulants and psychosomimetic agents. These groups are considered to be general characterizations which make it possible to provide short descriptions of old or newly discovered compounds, but there is a gradual transition from one to another group which precludes these from being regarded as watertight compartments.

Psychiatry, Psychotherapy and Psychology.

T. S. SSASZ (*A.M.A. Arch. gen. Psychiat.*, November, 1959) gives arguments against the contemporary official stand of the American Medical and Psychiatric Associations concerning the role of the non-medical psychotherapist. He believes that the subject matter and methods of medicine and psychotherapy differ in fundamental ways, that the notion of mental illness is a myth, and that a proper differentiation must be made between institutional and instrumental definitions of what constitutes medicine and psychotherapy. As an example, he states that when a man has a headache and buys an aspirin this is "self-medication", but if it is prescribed by a doctor it is "medical treatment". Instrumentally the two situations are alike; institutionally they differ. He argues that psychotherapy is instrumental rather than institutional in concept. The author points out that non-medical psychotherapists have contributed most impressively to the theory and practice of their discipline, and that there must be something amiss with an ethical code which proclaims that this ought not to occur. He asserts that the supervision of these lay therapists by medical graduates cannot be justified on technical grounds. Although it is true that patients undergoing psychotherapy may be physically ill as well, it is not necessary to assume that such a patient is *ipso facto* incapable of exercising the same care for his bodily health as he would were he not seeking such help. The author concludes that the official psychiatric view is basically an attitude of judicial prohibition, and points that it is often a matter of controversy as to which person's or group's needs are protected, and the needs of which others violated by such legislation. He separates medicine as a profession dealing with the human body as a "physiochemical machine" from psychotherapy, which deals with "man as a social being", and points out how little use is made of their medical training by physicians who practise psychotherapy.

Suicide in Adolescents.

B. H. BALSER AND J. F. MASTERSON, JR (*Amer. J. Psychiat., November, 1959*) comment on the paucity of reported cases of attempted suicide in adolescence. From the statistics available there appears to be a marked increase in the number of successful suicides during this period (15 to 19 years of age) as compared with childhood, but it still constitutes only 2% of the total number in all age groups. With attempted suicides, 12% occurred during adolescence, and females outnumbered males in the ratio of ten to one. The authors have studied 500 patients between the ages of 13 and 19 years, and of these 37 attempted suicide; 23 of these were diagnosed as schizophrenics. The authors conclude that in adolescence it would seem that a relationship exists between suicidal attempt and schizophrenic reaction, rather than with affective disorders as in adults.

Murdering Mothers.

W. TUTEUR AND J. GLOTZER (*Amer. J. Psychiat., November, 1959*) report the cases of five mothers who had murdered their children, and whom they had interviewed. Faulty relations to either parent or extremely poor marital adjustment, or both, were present in each case. A feeling of general inadequacy and inability to raise children was admitted by all mothers. Four of them attempted suicide as part of a preconceived plan, and this in the authors' opinion rules out the possibilities of punishment and revenge as motivating factors; secondary gain appeared to be absent also. All five appeared to have regretted what they had done. The authors claim that the disparity between logic and affectivity was so strong in each case during commitment of the act that a diagnosis of schizophrenia was justified in all cases.

Placebo Response in Schizophrenic Out-Patients.

L. D. HANKOFF, D. M. ENGELHARDT AND N. FREEDMAN (*A.M.A. Arch. gen. Psychiat., January, 1960*) have studied the response of 103 chronic schizophrenics to an inert tablet. A favourable response was noted in 42 and an unfavourable one in 20. Favourable placebo response was predictive of "success" in treatment when occurring in conjunction with a high degree of denial of mental illness. It was found to be correlated with the patients' defence mechanism (denial), the intake situation (referral source), and clinic treatment outcome. The authors regard the placebo response as a non-verbal communication between doctor and patient in a specific treatment setting, the affective response to therapy being displaced to the concrete pill. They claim that their results have practical implications in the treatment of lower class and inarticulate chronic schizophrenics, in that the placebo response helps to define the treatment relationship and to predict the course of therapy.

Prefrontal Leucotomy.

S. SCHULTZ AND A. L. HENDERSON (*Canad. Med. Ass. J., December 1, 1959*) report a follow-up study based on 311 cases of prefrontal leucotomy performed between the years 1944 and 1957. Of these, 308 had been followed for two years, and 242 for five years. The authors consider that the best single indicator of the value of leucotomy is the probability that after five years 35 out of 100 patients will be considered to have benefited from the procedure. They state that new methods of treatment have reduced the number of patients requiring leucotomy, but they maintain that when all other forms of treatment fail, leucotomy may be considered, and they believe that their results have justified treatment by leucotomy during the years under consideration.

The Patient as Listener.

K. GEOCARIS (*A.M.A. Arch. gen. Psychiat., January, 1960*) provides a preliminary report on the treatment of six patients with a range of complaints who listened between appointments to unedited tape recordings of their therapy sessions. He found it most valuable in the treatment of character symptoms, and maintains that the patients appear to repress less material between sessions, and become more quickly aware of their character defences, frequently with the perception into consciousness of increased amounts of anxiety, and that there seems to be an increase in their capacity to develop insight. He has the impression that it enhances the effectiveness of therapy given once or twice weekly.

NEUROLOGY.

Intracranial Aneurysms.

T. CRAWFORD (*J. Neurol. Neurosurg. Psychiat., November, 1959*) makes some observations on the pathogenesis and natural history of intracranial aneurysms. This account of the development of intracranial aneurysms and the way they grow and rupture is based on 163 cases of ruptured cerebral aneurysms. The site of the rupture was in the fundal segment in 64%, while rupture in the cervical region was uncommon. In pathogenesis, three main factors, developmental faults in the media, atherosclerosis and hypertension, play roles of varying importance, according to the age at which aneurysms develop. The media of cerebral arteries is much thinner than in other vessels of comparable calibre, and the external elastic lamina is poorly developed. Developmental faults in the media, leaving gaps of various sizes, occur quite commonly at arterial junctions. In atherosclerosis localized thinning of the media occurs, down to almost complete disappearance in some cases. When atheroma occurs at a site already weakened by a developmental fault, then the effect is likely to be additive.

Research.

RESEARCH PROJECTS IN MEDICINE AND ALLIED SCIENCES IN AUSTRALIA.

THE following is a list of research projects being undertaken in various institutions in the field of medicine and the allied sciences. The list is incomplete, but comprises such information as we have been able to gather fairly readily. It is hoped to publish a list of this kind each year for general information, and we shall welcome the cooperation of grant-making bodies in making future lists as comprehensive as possible. We are grateful to those who have supplied the information in the present list, and to Dr. T. E. Lowe, who suggested the idea in the first place.

Grant-Making Body.	Project.	Institution or Department.	Principal Worker(s).
University of Sydney.	Comparative histology of mammalian alimentary and genital systems. Morphogenetic studies. Comparative histology of molluscs and development of muscle. Arthritic changes in the temporo-mandibular joint. Morphology and physiology of activation process in eggs of marine invertebrates. Cytochemical changes during early history of germ cells in the male.	Histology and Embryology.	Mr. E. W. van Lennep. Dr. B. R. A. O'Brien. Mr. G. E. Sullivan. Dr. C. J. Griffin. Professor K. W. Cleland. Mr. G. E. Sullivan. Mr. C. S. Sapsford.
	Studies on visual system. Neuro-muscular transmission.	Physiology.	Professor P. O. Bishop. Dr. W. Burke.
	Biophysics of circulation: (a) Cellular function, especially active transport. (b) Fatty acid desaturation. (c) Uncoupling agents in plasma from individuals with malignant disease.	Biochemistry.	Dr. M. G. Taylor. Dr. W. J. Hensley. Dr. G. M. Kellerman.
	Cardiotonic substances. Electrical studies on muscle.	Pharmacology.	Professor R. H. Thorp. Mr. L. B. Cobbin. Dr. E. A. Johnson.
	Relation between oliguria and tubular necrosis in experimental acute tubular nephrosis. Effects of anti-lung serum in producing pulmonary interstitial fibrosis. Studies in histochemistry and immunological phenomena. Osteogenesis in normal, rhachitic and neoplastic bone. Histo-chemistry and immunological phenomena in pregnancy and childhood. Pathogenesis of viral hepatitis and cirrhosis and relation between fibrotic changes in portal and systemic systems.	Pathology.	Dr. E. S. Finckh. Dr. K. Viner Smith. Professor F. R. Magarey. Associate Professor D. A. Cameron. Professor F. R. Magarey. Mr. M. A. F. Connolly.
	Mechanism of tissue damage by virus infection: (a) Organisms in mixed culture. (b) Development of instruments for study of microbial environments. Mechanism of virulence in *Leptospira*. Metabolism of virus-infected tissue.	Bacteriology.	Professor P. M. de Burgh. Mr. G. Charlton. Dr. S. Faine. Professor P. M. de Burgh.
	Respiratory research laboratory. Research into rheumatoid arthritis and related disorders. Study of a group of persons with hæmophilia as a handicapped community. Research on immunochemical and electrophoretic characterization of serum and urine proteins.	Medicine.	Professor C. R. B. Blackburn. Dr. J. R. Read. Dr. D. F. J. Halmagyi. Dr. H. J. F. Colebatch. Dr. K. T. Fowler. Professor C. R. B. Blackburn. Dr. M. Owen. Mr. C. B. Kerr. Mr. G. T. Stevenson.
	Regeneration of gastric epithelium. Excess lactate in ischæmia.	Surgery.	Associate Professor G. W. Milton. Mr. J. P. Halliday.
	Urinary excretion of 5-beta-pregnane-3-alpha-20-alpha-diol, œstrone, œstriol and œstradiol in virilizing syndromes. Quantitative cytochemical investigations in normal and neoplastic cells of human endometrium.	Obstetrics.	Associate Professor R. P Shearman. Professor B. T. Mayes. Mr. Sardool Singh.
	Follow-up study of neurotic illnesses. Research on homosexuality.	Psychiatry.	Dr. D. C. Maddison. Dr. J. S. Shand. Miss M. Grutzner. Mr. J. E. Lyttle.
	Research on chemotherapy of tuberculosis.	Organic Chemistry.	Professor C. W. Shoppee. Dr. J. Cymerman Craig.
	Cell reaggregation following radiation.	Zoology.	Dr. J. R. Simons.
	Investigation of epithelium of skin of sheep.	Veterinary Pathology and Bacteriology.	Professor H. R. Carne.
	Development of methods of hormone or hormonal metabolite estimation in body fluids and studies on metabolism of steroids.	Veterinary Physiology.	Professor C. W. Emmens.
University of Adelaide.	Follow-up measurements of children in Yuendumu, Northern Territory, begun in 1951.	Anatomy.	
	Investigations of Salmonella bacteriophages. Comparative microbiological activity in two contrasting soils (Seddon and Urrbrae), with special reference to dentification. Investigation of the anti-bacterial action of Australian plant material and various synthetic substances and of various fungi. Bacteriophages affecting Gram-negative bacilli. Bacterial genetics. Study of anaerobic non-sporing bacilli. Immunogenetics of Salmonellas.	Bacteriology.	
	Radioisotope measurement of: (a) Calcium and vitamin D metabolism. (b) Protein biosynthesis. (c) Carbohydrate metabolism in rats, insects and microorganisms. Influence of vitamins on protein synthesis.	Biochemistry.	

Grant-Making Body.	Project.	Institution or Department.	Principal Worker(s).
University of Adelaide.	Investigations of the arylsulphatases. Studies on the flavoprotein enzymes of *Lb. arabinosus*. Study of the biochemical action of growth hormone. Research on the function of vitamin D_3 in chickens. Carbohydrate metabolism of insects. Studies on the metabolism of Ochromonas.		
	An investigation into the formation of the gingival sulcus in animals and humans. An investigation into the incidence of periodontal disease. Cephalometric analysis. Cinema analysis of jaw movement during mastication. Histopathology of dental caries and a secondary dentine formation using very thin hard sections. The relationship between the caries incidence in children and their general growth and development. Studies in child dental health and preventive dentistry. Survey of dentist population ratios and dental services. Investigations on refractory materials and ceramics in dentistry. Further field studies on dental conditions of Central Australian aborigines. The nature and occurrence of secondary dentine in deciduous teeth.	Dentistry.	
	Investigations into kuru: (*a*) Genetical markers. (*b*) E.E.G. and E.M.G. study. Study of thyroid function. Investigation into anæmia of chronic infection.	Medicine.	
	Transmission of sodium across the placenta in normal and abnormal pregnancy measured by radioactive tracers Na_{24}.	Obstetrics and Gynæcology.	
	Survey of dental health in pregnancy and its relationship with infant development.	Dentistry and Obstetrics and Gynæcology jointly.	
	Investigation of cerebral circulation by perfusion of vessels and by whole brain histological sections. Electron microscopy of normal and diseased tissues. Traffic Injury Research Unit.	Pathology.	
	Action of pharmacological antagonists of adrenaline and noradrenaline on vascular responses in man. Pharmacology of Australian plants. Neurophysiology with particular relation to pain. Studies in lipid metabolism using radioactive isotopes. Innervation of skin and muscle blood vessels in man. Cardio-vascular and respiratory effects of adrenaline and 5-hydroxytryptamine in man. Thalamic afferent projections. Central control of afferents. Vascular reflexes studied by means of diameter recording. Actions of morphine and morphine antagonists on acetylcholine synthesis in brain. Influence of drugs on certain aspects of the excitability of the peripheral nerve. Studies on lipid metabolism and atherosclerosis. Nerve electrotonic and action potentials.	Physiology.	
Royal Australasian College of Physicians.	Respiratory physiology and the pulmonary circulation.	Dept. Medicine, Univ. Sydney.	Dr. D. F. J. Halmagyi.
	Gastro-enterology.	Dept. Medicine, Univ. Western Australia.	Dr. R. A. Joske.
N.S.W. State Cancer Council.		Univ. Sydney: Dept. Veterinary Physiology. Dept. Biochemistry. Dept. Pathology. Dept. Organic Chemistry. Dept. Veterinary Pathology and Bacteriology. Dept. Zoology. Dept. Pharmacology. School of Public Health. Dept. Surgery. Dept. Biochemistry. Dept. Pharmacy.	 Professor C. W. Emmens. Dr. J. K. Pollak. Associate Professor D. A. Cameron. Professor C. W. Shoppee. Professor H. R. Carne. Dr. J. Simons. Professor R. H. Thorp. Dr. P. L. T. Ilbery. Dr. F. H. Mills. Dr. H. L. Webster. Mr. B. T. Brown.
		Univ. New South Wales: Dept. Organic Chemistry. School of Biological Sciences. Dept. Physical Chemistry.	 Dr. M. H. Maguire. Dr. F. J. Moss. Dr. J. L. Garnett.
		St. Vincent's Hospital, Sydney.	Dr. K. A. McGarrity.
		Royal College of Obstetricians and Gynæcologists.	

Grant-Making Body.	Project.	Institution or Department.	Principal Worker(s).
N.S.W. State Cancer Council.		Univ. New England: Dept. Zoology.	Professors A. F. O'Farrell and A. Stock.
		Unit of Clinical Investigation, Royal North Shore Hospital.	Dr. F. F. Rundle.
Anti-Cancer Council of Victoria.	A study of plant cell-division hormones and gibberellins in seed dormancy.	Univ. Melbourne: Dept. Botany.	Mr. K. G. M. Skene.
	Gene action in the fungus *Neurospora crassa*.	Dept. Chemistry.	Dr. J. A. Pateman.
	Low energy secondary radiation emitted during γ-irradiation of water, etc.		Dr. J. F. Duncan.
	Investigation of the products produced by heat on foodstuffs.	Dept. Organic Chemistry.	Professor W. Davies.
	Mechanisms of anæmias in lymphomas and chronic leukæmias.	Dept. Medicine, St. Vincent's Hospital.	Dr. G. C. de Gruchy.
	Cellular index of sensitivity to ionizing radiation.	Dept. Obstetrics and Gynæcology.	Dr. W. Chanen.
	Mode of action of diaminoazo dyes.	Dept. Pathology.	Dr. P. E. Hughes.
	Electronmicroscopy.		Dr. N. Xeros.
	Study of various tumours and of leukæmia by globulin-fluorescein stains.		Dr. C. J. Louis.
	Study of congenital abnormalities.		Dr. B. Stratford.
	Study of naturally occurring and experimentally induced tumours in dogs.		Miss Ann Jabara.
	Study of nucleic acids in normal and tumour cells.		Dr. D. W. Menzies.
	Enzyme studies on liver carcinogens.		Professor G. S. Christie.
	Dimethylnitrosamine carcinogenesis.		Mr. R. Le Page.
	Action of carcinogens of the dimethyl 4-aminodiphenyl group.		Professor E. S. J. King.
	Electron microscopic studies.		Mr. S. V. Hohlov.
	Electromicroscopic studies of normal and neoplastic liver cells.		Dr. S. Weiner.
	Investigation of activity of carcinogens.		Mrs. S. Ovenden.
	Investigation into animal tumours.		Dr. H. B. Rudduck.
	Metabolites in cancer urine.	Dept. Pharmacology.	Professor F. H. Shaw.
	Factors affecting the growth and metabolic activity of the Hanske Lettre Ehrlich mouse ascites tumour.	Dept. Physiology.	Dr. D. A. Coats.
	Adrenocortical hormones.		Dr. E. M. Trautner.
	Problems of tissue transplantation.		Dr. D. A. Denton.
	Production of molluscum sebaceum by the application of chemical carcinogens to depilated skin.	Dept. Surgery.	Mr. Kenneth Cox. Mr. Ian Russell.
	Cellular enzyme systems in relation to neoplasia.	Baker Medical Research Institute.	Dr. R. Wyllie. Dr. D. McCutcheon. Dr. Chev Kidson.
	The effect of ionizing radiation on blood picture.	Cancer Institute Board.	Dr. D. O. Shiels.
	Immunological behaviour of carcinomas.	Prince Henry's Hospital.	Dr. S. Wiener.
	Leukæmia in children.	Royal Children's Hospital.	Dr. J. H. Colebatch.
	Serum proteins in myelomatosis.	St. Vincent's School of Medical Research.	Dr. P. Edman.
Alfred Hospital, Melbourne.	Studies concerned with renal function and hypertension.	Baker Medical Research Institute.	Dr. P. Kincaid.
	Organ blood flow under conditions of cardio-pulmonary by-pass.	Baker Medical Research Institute and Thoracic Surgical Unit.	Dr. D. Race.
	Cardiac output in man during anæsthesia.	Department of Anæsthesia and Resuscitation.	Dr. P. J. Armstrong.
	Social problems of cardio-vascular diseases.	Baker Medical Research Institute and Almoner's Department.	Mr. B. B. Thomas.
	Hæmorrhagic diseases: (*a*) Diagnosis. (*b*) Treatment.	Baker Medical Research Institute.	Dr. R. J. Sawers.
	Metabolism of leucocytes in leukæmia.		Dr. R. J. Sawers.
	Calcium metabolism.	Diabetic and Metabolic Unit.	Dr. H. D. Breidahl.
	Review of cases of thyrotoxicosis.		Dr. H. D. Breidahl.
	Road accidents.	Professorial Surgical Unit.	Dr. I. McN. Smith.
	Head injuries (management of).	Neurosurgical Unit and Baker Medical Research Institute.	Dr. W. McDonald.
	Gall-bladder disease.	Baker Medical Research Institute.	Dr. G. Grove.
National Health and Medical Research Council.	Biosynthesis of hæm a and other hæmoproteins using Fe^{59}.	Royal North Shore Hospital of Sydney.	Dr. R. Lemberg.
	Study of hæm a compounds.		
	Final work on the chemistry of porphyrin a; the nature and attachment of the long alkalyl side chain or side chains.		
	Biosynthesis of porphyrins.		
	Lactoperoxidase.		
	Chemistry of the prosthetic group of cytochrome a_3.		
	(*a*) Studies on enzymes of the endocrine glands with particular reference to those of the thyroid and adrenal glands. Mechanism of thyroid hormone biosynthesis.	Univ. Melbourne: Dept. Biochemistry.	Professor V. M. Trikojus.
	(*b*) Goitre project. Isolation of natural goitrogens. Testing of milk fractions from animals fed suspected plants.		
	Continuation of studies on factors controlling biochemical adaptation to exercise.		Associate Professor Rawlinson.
	(*a*) Nucleic acid metabolism and the biochemistry of adaptive enzymes.		Mr. J. W. Legge.

Grant-Making Body.	Project.	Institution or Department.	Principal Worker(s).
National Health and Medical Research Council.	(*b*) Conditions determining secretin levels in the duodenal mucosa of experimental animals. Determination of the chemical structure of hitherto undescribed phospholipids, their distribution in animal tissues and their exchange with radioactive inorganic phosphate.		Dr. F. D. Collins.
	(*a*) Blood coagulation problems in relation to open heart surgery. (*b*) Separation and identification of coagulation-promoting lipids. (*c*) Influence of snake venoms on blood clotting factors.	Baker Medical Research Institute, Melbourne.	Dr. P. Fantl.
	Study of the function of lipids of erythrocytes. (i) Study of the nature of the electron transport system in respiring yeast particles. (ii) Mechanism of the cellular accumulation and transport of organic molecules.	Univ. Sydney: Dept. Biochemistry.	Dr. Eva Eden. Dr. G. M. Kellerman. Dr. A. W. Linnane.
	To find the natural acceptors, which may be flavoproteins that are linked with the lactic acid dehydrogenases of *Lactobacillus arabinosus* 17-5.		Dr. A. W. Snoswell.
	Development of the column chromatography of protein using cellulose ion-exchange resins.	Univ. Adelaide: Dept. Biochemistry.	Dr. E. S. Holdsworth.
	Enzyme structure in relation to catalytic activity. Studies on the proteins of plasma and other body fluids. Serum proteins in kuru. Continuation of the study on the differences of serum protein types in Australian and other south-east Asian populations. Metabolism of drugs. Investigation of the proteins of normal and carcinomatous thyroid glands.		Dr. P. Edman. Dr. J. A. Owen. Dr. C. C. Curtain. Dr. R. L. Kirk. Dr. S. E. Wright. Dr. P. S. Stanley.
	(*a*) Investigation of the chronic disease which may be caused by or associated with the formation of auto-antibodies. (*b*) Study of diseases of the gastro-intestinal tract aided by biopsy procedures, improved methods of biochemical investigation and gastrophotography. (*c*) Continuation of the long-term investigation of chronic gastritis.	Clinical Research Unit, Royal Melbourne Hospital.	
	(i) Studies of the splanchnic circulation, liver and spleen with special reference to patients with cirrhosis of the liver. (ii) Studies in mineral metabolism, especially calcium and phosphorus. (iii) Studies of fat absorption from the intestinal tract of man. (i) Continuation of experimental studies of aspiration of fluids into the livers of sheep. (ii) Effect of 100% oxygen breathing with and without hyperventilation on arterial oxygen saturation—and its implications in V/Q abnormalities. (iii) Implementation of modern "single breath" procedures for estimating all aspects of pulmonary function as a necessary prerequisite for horizontal and longitudinal studies in large groups of patients. (iv) Development of techniques of recording intra-arterial pO_2 by means of polarography. (i) Investigation of calcium and citrate metabolism and their interrelationships, with particular reference to the actions of parathyroid secretions and the renal excretion of calcium. (ii) Studies of aminoaciduria, particularly with relation to disorders of calcium metabolism and renal function.	Univ. Sydney: Dept. Medicine.	Professor C. R. B. Blackburn. Dr. R. B. Blacket. Dr. L. C. A. Watson.
	Studies in coronary disease.	Dept. Medicine, Royal Melbourne Hospital.	Professor R. R. H. Lovell.
	(i) Continuation of investigations of circulating thyroid hormones in health and disease. (ii) Continuation of studies of intracellular effects of salicylate, thyroid and adrenal hormones.	Dept. Medicine, Univ. Adelaide (Queen Elizabeth Hospital).	Dr. M. L. Wellby. Dr. J. S. Charnock.
	(i) The regulation of body fluid volume in man—in particular the study of the behaviour of aldosterone and other steroids in congestive cardiac failure in its various phases. (ii) Cardioactive plasma factor: investigation into the effect of ions and drugs on the surface electrical activity of cardiac muscle cells using the micro-electrode techniques already established.	Baker Medical Research Institute, Alfred Hospital, Melbourne.	Dr. T. E. Lowe.
	(i) The comparison of "adreno-cortical responsiveness" to three preparations of retard-corticotrophin. (ii) The assessment of anterior pituitary responsiveness using S.U. 4885. (iii) Further work on steroid excretions.	Univ. Queensland: Dept. Medicine.	Dr. A. W. Steinbeck.
	Structure and function of the epidermis.	Univ. Sydney: Dept. Histology.	Professor K. W. Cleland.
	Laboratory and epidemiological studies of respiratory viruses.	Epidemiological Unit, Fairfield Hospital, Melbourne.	
	Experimental biology and associated activities. (i) Continuation of studies upon complement-fixing and precipitating "auto-antibodies" in human sera and in rabbits. (ii) Continuation of studies upon an antigenic substance appearing in serum in cases of carcinoma, by various immunological techniques including the Schultz-Dale method, agar gel diffusion, and passive cutaneous anaphylaxis.	Walter and Eliza Hall Institute of Medical Research, Melbourne.	Sir Macfarlane Burnet. Dr. W. E. R. Hackett.
	(i) Investigation into insulin antagonist. (ii) Investigations into insulin synthesis by perfused cat pancreas. (iii) Investigations on steroid metabolism. (iv) Thyroid physiology. (v) Clinical studies on diabetes mellitus.	Alfred Hospital Melbourne.	Dr. J. Bornstein.
	Electron microscopy of the normal, atherosclerotic, lathyrous and lathyrous plus atherosclerotic rat aorta. Experimental pathology of shigellosis. The effects of various hormones and vitamins on bone. Study of the lipotropic effect of ethyl trichloracetate on the livers of choline-deficient rats and of the intermediate metabolism of the liver so as to discover the mode of action of this drug. Osteogenesis in normal and rhachitic rats.	Univ. Adelaide: Dept. Pathology.	Professor J. S. Robertson. Dr. G. N. Cooper. Dr. E. Storey. Dr. C. C. Kratzing. Dr. D. A. Cameron.

Grant-Making Body.	Project.	Institution or Department.	Principal Worker(s).
National Health and Medical Research Council.	Investigation of the chemical nature of the soluble iron liberated by acid-peptic digestion and by alkaline tryptic digestion. Investigation of substances which enhance iron absorption such as ascorbic acid and cysteine. Study of the role of chemical substances in food, such as phytic acid, which form insoluble iron compounds and which are thought to prevent absorption.	Red Cross Blood Transfusion Service, N.S.W.	Dr. R. J. Walsh.
	Red cell destruction and formation with particular reference to red cell metabolism in congenital and acquired hæmolytic anæmias.	St. Vincent's Hospital, Melbourne.	Dr. G. C. de Gruchy.
	Investigation of the beta protein pattern in aborigines.	Univ. Queensland: Dept. Physiology.	Dr. O. E. Budtz Olsen.
	Survey of the anæmias of pregnancy.		Dr. R. N. Ibbotson.
	Salmonellas in Australia.	Univ. Adelaide: Dept. Bacteriology.	Dr. Nancy Atkinson.
	Studies of staphylococcal epidemiology.	Fairfax Institute of Pathology, Royal Prince Alfred Hospital, Sydney.	Dr. Phyllis Rountree.
	(i) Examination of soil samples for presence of keratinophilic and other pathogenic fungi. (ii) Presence of air-borne fungus spores in atmosphere their relation to allergic diseases and preparation of extracts for diagnosis of allergy.	Royal North Shore Hospital, Sydney.	Dr. E. Beatrix Durie.
	(*a*) Antagonists to isoniazid. (*b*) Antituberculous activity of phenanthrolenes. (i) Mechanisms of inherent resistance of different mouse strains to tuberculosis. (ii) Influence of size of infecting dose on duration of immune phase of experimental tuberculosis. (iii) Duality of tuberculin hypersensitivity. (*a*) Tryptophane biosynthesis. (*b*) Metabolism of vitamin K derivatives by microorganisms. (*a*) Genetic transduction in *Pseudomonas æruginosa*. (*b*) Hose-induced modification in *Pseudomonas* phages. (*c*) Genetic transduction in *Staphylococcus pyogenes*. Mode of action of isoniazid. Biosynthesis of penicillin.	Univ. Melbourne: Dept. Bacteriology.	Professor S. D. Rubbo. Dr. G. N. Vaughan. Dr. Shirley Dixon. Dr. Cathryn Byrne. Dr. D. F. Gray. Dr. F. W. Gibson. Dr. B. W. Holloway. Dr. J. Youatt. Dr. W. J. Halliday.
	(i) Research on peripheral nervous system with particular reference to nerve fibre-muscle fibre ratios (trochlear nerve and superior oblique muscle); remote effects of injuries to nerves; connective tissue of peripheral nerve: stress-strain phenomena in nerve roots and denervated peripheral nerves. (ii) Morphology, blood supply and neural relationships of pineal body. Neuropharmacological and neurophysiological studies.	Univ. Melbourne: Dept. Anatomy.	Professor S. Sunderland. Dr. C. W. Dunlop.
	Brain research unit. Adrenal cortical function.	Univ. Sydney: Dept. Physiology.	Professor P. O. Bishop. Dr. E. V. Mackay.
	Continuation of cardio-vascular studies and relationship between chemical structure and pharmacological action.	Univ. Sydney: Dept. Pharmacology.	Professor R. H. Thorp.
	Animal-feeding experiment studying association of serum hexosamine levels and atherosclerosis and influence of unsaturated dietary fat. Further development of technique of gas-chromatography and its application in analysing composition of lipoproteins of Australians, both healthy and atherosclerotic, and natives of New Guinea.		Dr. A. A. Palmer.
	Histological work with regard to salivary glands and other investigations. Tissue injury. Electrocardiography. (i) Use of complex inorganic cations in investigation of biological mechanism. (ii) Use of bemegride. (*a*) Study of ionic basis of electrical activity in mammalian smooth muscle. (*b*) Study of salivary gland secretory potentials, especially of sheep parotid gland, using intracellular techniques for measurement of membrane potential and membrane resistance. (*c*) Measurement of membrane resistance of toad skeletal muscle fibres during negative after-potential. Effect of drugs on this resistance. Identification of source of humoral stimulus to adrenal aldosterone secretion and defraction of specific stimulus causing release of this trophic hormone. (i) Electromyographic studies of muscle function. (ii) Adaptation of intracellular techniques to study of behaviour of biological membranes to constant current stimulation. (iii) Development of instrumentation for variety of research problems in the Departments of Physiology and Pharmacology as required.	Univ. Melbourne: Dept. Physiology.	Professor R. D. Wright. Dr. E. R. Trethewie. Dr. A. Shulman. Dr. Mollie Holman. Ionic Research Laboratory. Dr. D. J. Dewhurst.
	(i) Investigation of level of oxytocic hormone in blood of man and hypothalami of various species. (ii) Estimation of level of oxytocic hormone in blood of man and other species in various conditions. (iii) Investigation of properties of oxytocic factor recently found in semen (human and sheep).	Univ. Queensland: Dept. Physiology.	Professor R. W. Hawker.
	(*a*) Formation of lymph. Regulation of blood flow and of capillary blood volume in intestines. Fat absorption and intestinal motility. Steady state experiments, using unabsorbable reference substance, on fat absorption and on emptying of terminal ileum. (*b*) Iron metabolism. Iron transport by marsupial breast. Storage and transport of iron under conditions of depletion and excess in rats.	Univ. Western Australia: Dept. Physiology.	Professor W. J. Simmonds. Dr. I. Kaldor. Dr. E. H. Morgan.

Grant-Making Body.	Project.	Institution or Department.	Principal Worker(s).
National Health and Medical Research Council.	Investigation of mechanism of action of reserpine on cardio-vascular system in man using measurement of limb blood flow and assay of noradrenaline in normal subjects and patients following sympathectomy and with postural hypotension. Investigation of mechanism of action of 5-hydroxytryptamine and other cardio-vascular acting substances using blood pressure measuring techniques in human subjects and certain selected patients. Continuation of work on chemical structure of biologically active muco-proteins, special attention being given to type of linkage joining carbo-hydrate-prosthetic group to the protein core.		Dr. V. J. Parks. Dr. S. L. Skinner. Dr. A. Gottschalk.
	Study of virus manipulation and mechanism of cell damage by virus, using ectromelia infection in mouse as model.	Univ. Sydney: Dept. Bacteriology.	Professor P. M. de Burgh.
The Post-Graduate Medical Foundation University of Sydney.	Research into mechanism of cell damage by virus infection. Equipment for research work in anti-lung serum. Investigation of biochemistry of structure and formation of cartilage and bone. Research into electromicroscopy of normal, rhachitic and neoplastic bone and of normal and neoplastic oral tissues. Investigation of hypothalamus control of storage and release of pituitary hormones. Work in field of cardio-pulmonary physiology. Investigation in urology on continence in tube cystostomies. Part-time research re continence with tube cystostomies. Part-time investigation of effects of incomplete ureteric obstruction. Research into viability of cells following very low temperature storage and irradiation. Research project concerning the mechanism of drowning and related problems. Research project designed to provide information regarding magnitude of the problem associated with the handicapped hæmophilic subject.	Univ. Sydney: Dept. Bacteriology. Dept. Pathology. Dept. Pharmacology. Dept. Physiology. Dept. Surgery. Dept. Preventive Medicine. Dept. Medicine.	Professor P. M. de Burgh. Dr. K. Viner Smith. Associate Professor D. A. Cameron. Associate Professor D. A. Cameron. Dr. P. A. Robertson. Associate Professor P. I. Korner. Dr. W. G. Lucas. Dr. D. D. Arnold. Dr. P. Ilbery. Dr. D. Halmagyi. Dr. J. H. Colebatch. Dr. C. Kerr.
	Study into gastric secretion.	Dept. Medicine, Univ. Sydney, and Royal North Shore Hospital.	Dr. D. W. Piper.
	Study of acid and pepsin secretion and influence on these secretions of various drugs used in treatment of peptic ulcer. Research on production and correction of incompetence. Research on the therapeutic treatment of thyrotoxicosis with radioactive iodine I^{131}.	Royal North Shore Hospital. Unit of Clinical Investigation, Royal North Shore Hospital.	Dr. D. W. Piper. Dr. I. Monk. Dr. T. H. Oddie.
	Isotopic investigation into cause of atherosclerosis. Part-time study for various factors responsible for the malabsorption syndromes following gastrectomy.	St. Vincent's Hospital.	Dr. G. S. Farkas. Dr. W. B. Hennessy.
	Investigation of coronary atheroma. Equipment for gas counting of C14 and tritium.	St. Vincent's Hospital—Dept. Physics.	Dr. E. P. George.
	Statistical survey of patients' records to determine significance of post-extrasystolic inversion of the T-wave of the electrocardiogram. Research into the cause and treatment of cancer of the skin.	Royal Prince Alfred Hospital: Hallstrom Institute of Cardiology. John Belisario Institute of Dermatology.	Dr. W. A. Seldon. Dr. J. C. Belisario.
	Investigation into prevention of staphylococcal infections by immunization. Special investigation and treatment of renal disease. Support for renal unit for research, special investigations and treatment of renal diseases. Use of plastic adhesives in bonding bone and application in other fields of surgery, etc. Research on the use of plastic adhesives in fracture work and other applications. Research into the physiology of bile and the biliary tract and its relation to cancer. Follow-up study of patients suffering from hypertensive cardio-vascular disease.	Sydney Hospital: Kanematsu Institute. Prince of Wales Division. Radiology Department. Cardio-Vascular Clinic.	Dr. S. Fisher. Dr. H. M. Whyte. Dr. H. M. Whyte. Dr. A. Sharp. Dr. B. Bloch. Dr. Bryan Williams. Dr. G. Bauer.
	Research on the fœtal heart monitor and placental oxygen consumption.	Dept. Obstetrics, Queen Elizabeth II Institute.	Professor B. T. Mayes.
	Research into biosynthesis of certain constituents of connective tissues and study of the influence of various steroid hormones on these processes.	Univ. N.S.W.	Dr. K. G. Rienits.
	Research into nutritional and hæmatological effects of surgery for peptic ulcer. Study of clinical and laboratory aspects of hæmatology and research project on behaviour of leukæmic cells in bone marrow culture.	Radcliffe Infirmary, Oxford.	Dr. D. J. Deller (Royal North Shore Hospital). Dr. J. C. Biggs.
	The pathology of the aging rat.	College of Physicians and Surgeons, Columbia Univ., N.Y.	Dr. A. Everitt (Department of Physiology, University of Sydney).
	Research on the effect of non-uniformity in the lung on diffusing capacity as measured by the various methods and work on mechanics of breathing or gas uptake by the red cells.	Univ. Pennsylvania.	Dr. R. A. B. Holland.
Life Insurance Medical Research Fund of Australia and New Zealand.	Development of techniques for direct-vision intracardiac surgery. Energy production in myocardium.	Alfred Hospital, Melbourne. Baker Medical Research Institute.	Dr. K. N. Morris. Dr. T. E. Lowe.

Grant-Making Body.	Project.	Institution or Department.	Principal Worker(s).
Life Insurance Medical Research Fund of Australia and New Zealand.	Metabolism of aortic wall.	Diabetic and Metabolic Unit.	Dr. J. Bornstein.
	Ætiology of pulmonary hypertension.	Green Lane Hospital, Auckland: Cardio-Thoracic Surgical Unit.	Dr. B. G. Barratt-Boyes.
	Experimental cardiac valve incompetence and its surgical correction.	Royal North Shore Hospital: Unit of Clinical Investigation.	Dr. Ian Monk.
	Reactions of vascular endothelium with particular reference to problem of thrombosis.	Royal Prince Alfred Hospital, Sydney: Fairfax Institute of Pathology.	Dr. V. J. McGovern.
	Causes of high blood pressure.	Univ. Melbourne: Dept. Medicine.	Dr. A. E. Doyle.
	Dissecting aneurysms of aorta.	Dept. Pathology.	Professor E. S. J. King.
	Pathogenesis and treatment of hypertension.	Univ. Otago Dunedin: Dept. Medicine.	Professor F. H. Smirk.
	Role of hypertension in arterial degeneration and in atherosclerosis.	*Univ. Sydney:* Dept. Pathology.	*Professor F. R. Magarey.*
	Electrophysiology of cardiac muscle.	Dept. Pharmacology.	Dr. E. A. Johnson.
	(a) Circulation in hypoxia. (b) Physiology of valvular incompetence. Peripheral vascular disease.	Dept. Physiology. Dept. Surgery.	Professor P. I. Korner. Professor J. Loewenthal.
	Instantaneous measurement of intravascular blood velocity, and study of pulmonary vascular resistance.	Travelling Fellowships.	Dr. K. L. Cotton.
	Study on physiology and pharmacology of cardiac function.		Dr. M. J. Rand.
	Hæmodynamic study of mitral incompetence.	Research Fellowship.	Dr. G. D. Thorburn.

Clinico-Pathological Conferences.

A CONFERENCE AT SYDNEY HOSPITAL.

A CLINICO-PATHOLOGICAL CONFERENCE was held at Sydney Hospital on August 18, 1959. DR. NORMAN ROSE, the Medical Superintendent, was in the chair. The principal speaker was MR. W. LUCAS, Honorary Assistant Urological Surgeon.

Clinical History.

The patient was an aboriginal woman, aged 40 years, who was taken to a country base hospital in a semi-comatose condition. Clinical and radiographic examination showed her to be about eight months pregnant; the fœtus was presenting by the breech. She had not had medical supervision during the pregnancy, but her husband reported that she had had no ankle swelling. The only history obtained was that she had had six previous pregnancies; one had resulted in a stillbirth, one in a normal confinement four years prior to the present pregnancy, and another two years previously in pre-eclampsia, and she had spent three months in hospital. On examination, the patient was found to be semi-comatose and severely dehydrated, and her liver was thought to be enlarged. Her blood pressure was 140/90 mm. of mercury and her temperature 102° F. There was no retinopathy. Investigations gave the following results. The hæmoglobin value was 11 grammes per 100 ml.; the leucocytes numbered 6400 per cubic millimetre, 53% being neutrophils including 9% myelocytes; there were 11 nucleated erythrocytes per 100 leucocytes. The blood sugar content was 130 mg. per 100 ml. The urine was found to contain "one-third" protein. On that day labour began, and within the next 24 hours breech extraction of a stillborn fœtus was performed with manual removal of the placenta. The patient's state of consciousness was such that no anæsthetic was required. After this her condition improved for about 12 hours. She was passing about 1 litre of urine per day, and proteinuria decreased to a heavy cloud. She continued to have fever. Tetracycline was given intramuscularly, in a dosage of 100 mg. every six hours. At this stage her blood urea content was 300 mg. per 100 ml. Microscopic examination of the urine revealed 40 to 50 pus cells per high dry field, with numerous erythrocytes and granular casts. Her condition deteriorated, her respiratory rate increased and she became more deeply unconscious. Three days after her delivery, she was transferred to Sydney Hospital.

On examination of the patient on her admission, she was seen to be an obese aboriginal woman not responding to painful stimuli. Her temperature was 105° F., her blood pressure was 110/60 mm. of mercury, her pulse rate was 140 per minute and her respirations numbered 40 per minute. Neck stiffness was present. No abnormality of the cranial nerves was found as far as they could be examined. Of the deep reflexes, only the biceps jerk could be elicited. The plantar responses were flexor in type. There was no tetany. The apex beat of the heart could not be palpated, and on auscultation the heart sounds were obscured by coarse crepitations audible over the entire chest. There was no dullness to percussion. The patient was considered to be still dehydrated; her tongue was dry and coated and her skin tone was poor; there was no peripheral œdema, and the jugular venous pressure was not raised. Her abdomen was obese and palpation was difficult. However, it was agreed that the liver and spleen were both enlarged to about three inches below the costal margin, and that both kidneys were palpable, the left possibly being larger than the right. The uterus was palpable at the level of the umbilicus. It was explored per vaginam by the Honorary Gynæcologist, who found only a few placental fragments and some blood clot. The lochia appeared normal, and he could find no evidence of pelvic infection. Examination of the urine revealed a trace of protein; the specific gravity was 1006. Further ingestigations gave the following findings. The hæmoglobin value was 10·9 grammes per 100 ml.; the leucocytes numbered 10,600 per cubic millimetre, 80% being neutrophils, 14% lymphocytes, 3% monocytes, 2% metamyelocytes and 1% myelocytes; there were two nucleated erythrocytes per 100 leucocytes. The erythrocyte sedimentation rate was 121 mm. in one hour. The blood urea nitrogen content was 95 mg. per 100 ml. The serum electrolyte contents, in milliequivalents per litre, were as follows: sodium, 136; potassium, 5; carbonic acid, 10. Lumbar puncture produced clear cerebro-spinal fluid, not under increased pressure; it contained one polymorph, one mononuclear cell and 500 erythrocytes per cubic millimetre; the protein content was less than 20 mg. and the glucose content was 75 mg., both per 100 ml.; the fluid gave a negative reaction to the Wassermann and Kahn tests. Examination of the urine revealed 20 to 50 erythrocytes and 10% leucocytes per high power field. X-ray examination of the chest and abdomen was attempted, but because of the patient's obesity and respiratory movement, satisfactory films were not obtained. Specimens of blood, urine and lochia were taken for culture.

The patient was given intravenously normal saline and later 5% glucose solution at the rate of 3 litres per day.

The intramuscular administration of tetracycline was continued, in a dosage of 100 mg. every four hours, and the intramuscular administration of penicillin, 500,000 units every four hours, was added. The patient's condition remained unchanged, and she died 19 hours after her admission to hospital.

Clinical Discussion.

DR. N. H. ROSE: Mr. W. Lucas, rather freshly arrived from the Johns Hopkins Hospital, has been presented with this difficult, but I do not think too difficult, case. I was informed, walking up the stairs, that this patient was admitted to the Clinical Research Ward, and during her short time there was neither dialysed nor diagnosed. I would like to present Mr. Lucas.

MR. W. LUCAS: In reviewing this case this afternoon, I would like first of all to run over the salient features of it, as the clinical picture unfolded. First of all, the patient is an aboriginal woman, and is brought in semi-comatose to a base hospital. The base hospital is presumably in New South Wales, because she finally came to Sydney Hospital. I think the most likely base hospital is Lismore or Grafton, because that is where most of the aborigines in the State are found.

Her presenting picture is one of semi-coma. She was found to be almost full-term, with a previous history of preeclampsia, and was pyrexial with a temperature of 102° F., but without any leucocytosis. Blood sugar was normal, she had a few primitive cells in the circulating blood, and she had a blood urea of 300. She remained in this state, was delivered and improved a little after delivery. She then had a heavy proteinuria, with a high number of red cells and white cells in the urine. She deteriorated after three days, and presumably because they were worried about her condition at the base hospital and thought the artificial kidney might be needed, she was transferred to Sydney Hospital.

At the stage when she presented here, her general condition was much the same; she again presented in coma, with a high temperature, and without a leucocytosis. She was deeply unconscious and only had a biceps jerk. There were coarse crepitations in the chest, and no œdema was found and there was no increased venous pressure. Examination of her abdomen revealed that liver, spleen and kidneys were palpable. The Honorary Gynæcologist reported that there was no pelvic infection, and the urine still contained a lot of pus cells and a lot of red cells, but the albumin content was now a trace. A lumbar puncture produced essentially normal cerebro-spinal fluid, and X-rays of the abdomen and chest were unsatisfactory. She was dehydrated, and was given intravenous therapy and antibiotics, but she died 19 hours after admission.

Now, I think that in considering the differential diagnosis, the first thing to come to mind is eclampsia. Here is a woman, eight months pregnant, unconscious, with proteinuria. Is this eclampsia? It seems reasonable to consider eclampsia first, but there are certain features which are not in favour of this diagnosis. In Sydney Hospital she was unconscious, but her reflexes were absent with the exception of a biceps jerk. This is not the picture of unconsciousness in eclampsia, when not only are reflexes briskly active, but their elicitation is liable to produce a fit. On this point alone her condition is unlike eclamptic coma. The prior history of preeclampsia, for which she spent three months in hospital, arouses suspicion. If she went to full term and spent three months in hospital without something in the way of rupture of membranes to bring on labour or a Cæsarean section, I am doubtful that her condition was in fact preeclampsia. What we can deduce from the fact that she was in hospital for three months at this stage was that there was something found in the urine which led to the suspicion of preeclampsia.

The picture as presented here suggests to me that the patient had some preexisting renal lesion, and she developed some complication of this which proved fatal.

What are the possibilities? The first which comes to mind is tuberculosis. In favour of tuberculosis is the fact that this woman is an aboriginal, and tuberculosis is a common disease amongst aborigines. I am thinking of renal tuberculosis, and note that she has in her urine a lot of pus cells and a lot of red cells. She possibly had these cells in her urine previously when she was thought to have preeclampsia. Why is she unconscious? A complication which comes to mind is miliary tuberculosis, which will give the picture of a high fever without a leucocytosis, with a raised blood urea, unconsciousness and absent reflexes. We do not know what her chest X-ray was like, but she certainly had a respiration rate of 40 per minute when she came to Sydney Hospital. And she also had râles throughout the lung fields. The course of her illness is compatible with rapid advance of miliary tuberculosis in an aboriginal. The palpable kidneys, liver and spleen are quite consistent with this diagnosis also. The kidneys may be enlarged and are easy to palpate in a woman who has just had a baby, as indeed are the liver and spleen if enlarged. I do not think there is any need to assume that there may be amyloid disease giving enlargement of the liver and spleen. So, on the evidence before us, I would put, as a clinical diagnosis, tuberculosis number one.

Following the idea that this patient had some chronic renal disease, a complication of which caused her fatal termination, other things come to mind, such as chronic urinary tract infection. Did she have any stones, or a chronic pyelonephritis, or a pyonephrosis with some complication? Could she have had a cerebral abscess as a complication of a chronic renal tract infection? It would fit the presenting feature of unconsciousness; but there is nothing on lumbar puncture. It is possible to imagine an abscess localized in some area such as the frontal lobe or temporal lobe, not communicating with the subarachnoid space and therefore not producing any abnormality in the cerebro-spinal fluid. However, there is no leucocytosis and the neutrophils are only 6400; yet the patient has a good pyrexial reaction with temperatures of 102° F. and 105° F. If this is a pyrexial response to infection, I would also expect some leucocytic response.

Other possibilities include polycystic kidneys. Has this patient had polycystic kidneys all along, which in this sixth pregnancy with superadded infection have been overwhelmed, with fatal results? I would like to know exactly what the kidneys felt like. Polycystic kidneys are usually easy to feel, particularly in a woman who has had six pregnancies and has just been confined, and usually the feel of them is fairly diagnostic. I would like to know exactly how they felt.

Hydatid disease is another possibility. The patient is an aboriginal from the country. It is possible she has hydatid disease of the kidneys and of the liver, causing enlargement, and of the brain, causing unconsciousness. I think this is stretching things a little, but it is a diagnosis to be considered.

Other conditions, such as hypernephroma with hepatic and cerebral metastases, are possible, but one would not expect such a degree of pyuria. Infection in the urine is a very marked feature of this case.

I would like at this stage to have a little more information. First of all, she had 9% myelocytes and 11 nucleated red cells per 100 white cells. I do not know enough about this to be dogmatic, but does this suggest to the pathologist any evidence of leukæmia, or such condition? I would like an opinion of the hæmatologist on this point. To try to make the diagnosis, I would also like to know what the samples of blood and urine showed. Was a Ziehl-Neelsen stain done on the urine? Was there any evidence of acid-fast bacilli? The films of the chest and abdomen are unsatisfactory, but satisfactory films would be interesting. Of course, it was impossible to get an intravenous pyelogram done, because the blood urea was too high, but I would like to have seen an X-ray of the renal tract.

So, I would like to know first of all from the hæmatologist whether the blood picture shed any light on the diagnosis? And, secondly, what did the urine show?

DR. ROSE: I think Dr. Gibson might be able to give you certain of those answers, and we have several consulting hæmatologists in the audience to enlighten us.

DR. J. GIBSON: The urine culture grew *Escherichia coli* and *Alcaligenes fæcalis* sensitive to chloramphenicol. A Ziehl-Neelsen stain was not done, and there was no culture made for acid-fast bacilli.

MR. LUCAS: Could you tell me exactly what the kidneys felt like on palpation? Did they feel cystic at all?

DR. GIBSON: It was noted that both were palpable. It was not mentioned whether or not they were cystic.

DR. R. J. WALSH: This blood picture suggests that erythropoiesis was taking place outside the medullary tissue, rather than leukæmia. The enlarged spleen and liver support this. It is rather suggestive of myelophthisic anæmia, due to some active invasive process of the bone marrow itself. One sees this picture in tuberculous invasion of the bone marrow, but you do not see it regularly in miliary tuberculosis.

MR. LUCAS: Well, the blood picture is compatible with tuberculosis. It also could be compatible with malignancy,

but I think if somebody get to the stage where they are dying of malignancy, it is usual to find more wasting than was present in this patient, who was obese. Therefore, unless she had a sudden and fatal cerebral metastasis, I think it is unlikely she suffered from a malignant condition.

In conclusion, I would put tuberculosis as number one. Number two is chronic suppurative pyelonephritis with stone or with a cerebral abscess. Number three diagnosis would embrace other conditions like hypernephroma with cerebral secondaries, or hydatid disease. I would like to hear anyone else's views on the subject.

DR. ROSE: Well, gentlemen, having heard Mr. Lucas's views on this patient, we will call for discussion. We are honoured today by having with us the former Dean of Otago Medical School, Sir Charles Hercus. I have seen Sir Charles making a few notes there. Would you care to say something, Sir?

SIR CHARLES HERCUS: I was particularly noting that I know nothing about your aborigines and was interested to hear that both hydatid disease and tuberculosis were common amongst them. I thought that Mr. Lucas's analysis was very good indeed, and agreed entirely with his elimination of the preeclamptic story by his observation that had preeclampsia existed, any touch would have set off the eclamptic syndrome, which it did not do. As regards the hydatid disease, was anything done by way of a Casoni test or a complement fixation test?

DR. GIBSON: No, Sir.

SIR CHARLES HERCUS: I can quite well understand that in such an acute story, hydatid disease did not cross the minds of the medical attendants; but the fact interested me that you do have hydatid disease amongst your aboriginal people. This conforms to our New Zealand experience, where the Maoris are much more susceptible to the disease than the Europeans. Thank you for the opportunity of speaking.

DR. KING: When I read the report, my own summing up was pyelonephritis, but I think Mr. Lucas has put the case very well in favour of tuberculosis. There is one point with regard to geography. In these days of air travel, I wondered whether the patient came from further afield, and the temperature might have been explained on the basis of malaria. In malarious areas, I understand, patients are always presumed to be suffering from two diseases, malaria plus the one which may be the cause of the symptoms. I have nothing to add, except to say that I have been converted from my original diagnosis of pyelonephritis to tuberculosis.

DR. W. L. CALOV: First of all, Dr. King has raised the question of malaria. One must concede that this is a possibility, but the blood was examined twice, and I would think that parasites would have been found in a woman as sick as this one and with such a high fever. People unaccustomed to looking for malaria parasites might miss the malignant forms. It is a long time since I saw one myself. If the staining is not good, and if one is unaccustomed to looking for malarial parasites, the small fine forms of the parasite are easily missed. On the other hand, she was sick for several days, and if she did in fact come from a malarious area, I really think someone would have suspected malaria, and I think the organism would have been found. There is no mention of polychromatic staining, which also might be found in malaria, not necessarily malignant malaria, which this would almost certainly be. I think that the best case has been made out for miliary tuberculosis. I came here rather puzzled about the case, and I think Mr. Lucas has made out an excellent case for miliary tuberculosis which would fill the bill. However, if she had miliary tuberculosis and was deeply comatose, one would think that there might be evidence of meningitis in the form of neck stiffness. So that while I think that, if one had to make a diagnosis, that would be the diagnosis to make, it would probably be wrong.

DR. ROSE: It does appear, ladies and gentlemen, that this patient was sent to Sydney Hospital in the hope that something might be done with a magic piece of equipment here, the artificial kidney. Few speakers have emphasized the causes and mechanism of the renal failure which investigations revealed. Dr. Hurt, would you like to comment?

DR. B. M. HURT: Only to seek information. I always approach the clinico-pathological conference rather suspiciously. Dr. Lucas has given us a great lesson in deduction; but following your line of thought, in the presence of a severe infection in a woman recently delivered of a stillborn baby, I thought of gas gangrene. I know some features do not fit, and would like information. Is this blood count compatible with that seen in clostridial infection? I know there is hæmolysis, and nucleated red cells are present, but there is usually also a leucocytosis.

DR. WALSH: Yes, leucocytosis is characteristic.

DR. HURT: Secondly, to Mr. Lucas; is there any possibility that this lady had a uterine infection?

MR. LUCAS: That is a possibility which I ruled out, chiefly because the pelvic examination made by the Honorary Gynæcologist showed no evidence of pelvic infection. On this evidence I feel one must assume it was not gas gangrene which caused the clinical picture.

DR. HURT: It only remains to congratulate Dr. Lucas on this confusing case. Whether he be right or wrong, he made it clear to me.

DR. WALSH: Mr. Chairman, if gas gangrene were to produce this number of nucleated red cells, I would expect a lower hæmoglobin value and the patient to be jaundiced. Furthermore, gas gangrene is unlikely to produce hæmolysis associated with a relatively high hæmoglobin and in the absence of leucocytosis.

DR. ROSE: Dr. Whyte, you know the answer. Is there anything you would like to say to stimulate further discussion?

DR. H. M. WHYTE: One point relating to geography. When Mr. Lucas has been here a week or two more, he will know that people flock to this place from all over the Commonwealth. I do not know that they yet come from New Zealand. From a renal point of view it is interesting to note how acidotic she is. She is extremely acidotic, almost severely enough to warrant using the magic instrument, the artificial kidney; because if she has no abscess in the brain or some such structural lesion, it is conceivable that it is the acidosis which is keeping her unconscious and so ill. Why is she so acidotic, and what could be done about it if this was the cause of her coma? One thing would have been dialysis, to dialyse out the acid, as distinct from adding things to neutralize the acid. Another interesting point is that she was considered to be dehydrated, with a dry and coated tongue and poor skin tone. Her urinalysis, however, showed a specific gravity of 1006, so that, in spite of clinical dehydration, she was continuing to dehydrate herself.

DR. ROSE: I think at this stage we might ask Dr. Alan Palmer to throw light on the diagnosis.

Pathological Report.

DR. A. A. PALMER: Firstly, the results of some cultures which were not available to Mr. Lucas. There were two blood cultures; the first produced no growth; *Pseudomonas*, sensitive to "Chloromycetin" and streptomycin, was cultured from the second; *E. coli* and *A. faecalis* were grown from the urine.

At autopsy it was noted that the body was that of an obese, middle-aged aboriginal woman. The pleural cavities each contained a little blood-stained fluid. The lungs showed moderate œdema, but no consolidation. The heart was dilated and flabby, but showed no valvular lesions. There was minimal atheroma of the coronary arteries and aorta. There was no peritonitis. The liver was moderately enlarged and soft, and so was the spleen. Neither showed any abscesses. Perirenal fat was adherent to both kidneys; the right was smaller than normal, and the cortex was narrowed and a large staghorn calculus was present in the pelvis and calyces; in the left kidney a small calculus was obstructing the pelvi-ureteric orifice, and pus distended the pelvis and calyces. The brain showed petechial hæmorrhages, but no gross lesion. Microscopic examination of the kidneys confirms the presence of abscesses and extensive active chronic pyelonephritis. The glomeruli show no convincing evidence of preeclampsia. In the lung there is a fair amount of œdema. The liver is enlarged, because of extreme fatty change which is probably attributable to toxæmia from the severe renal and blood-stream infection.

In summary, therefore, there were: (i) bilateral renal calculi with left pyonephrosis; (ii) bacteriæmia; (iii) moderate pulmonary œdema.

Pathological Discussion.

MR. LUCAS: I was very interested to see the pathological findings. I was put off a pyogenic infection because there was no leucocytosis, which I would have expected

with a septicæmia due to a pyogenic organism. Because of this I put tuberculosis first. In retrospect, if we had had an X-ray of the abdomen and had seen the stones, we could have put catheters beyond them to drain the renal pelvis, and maybe the artificial kidney would have been used. But she was only admitted 19 hours before death, and it is difficult to get a good X-ray of a woman in this state, and to get the other things organized. I do not think I have anything further to add.

DR. WHYTE: Dr. Palmer, did you refer to the uræmic lung?

DR. PALMER: Well, does the œdema mean that she was really more hydrated than it appeared from the clinical picture?

DR. WHYTE: We are always in this quandary with these renal people, particularly the anurics. They may appear dehydrated and yet be over-hydrated, to the extent even of 10 litres. They may even have gross pulmonary œdema, with a dry, parched mouth and all the external aspect of dehydration. I do not quite know where this fits in. She appeared dehydrated, was not anuric and had pulmonary œdema. She was not uræmic enough to qualify for the uræmic lung argument. In grossly uræmic patients there may be a wet lung, said to be due to uræmia. Whether or not this is so, or whether it is simply over-hydration, or cardiac failure, I don't quite know. I wondered, Sir, if anyone had any comments about the lack of leucocyte response, which is so marked?

A DOCTOR: I am as confused as ever about *Ps. pyocyanea*. Does it come into the conventional grouping of pus-forming organisms?

DR. FISHER: It does. It has been named because it forms blue pus, but I feel in this case it was perhaps a terminal event more than anything else. Although present in one blood culture, it was not found in the urine, or in the vagina. I do not know whether it is significant. What puzzles me is, how does this pyelonephritis explain the blood picture, and is there any evidence of bone-marrow disease?

DR. PALMER: The kidney showed gross post-mortem degeneration and hence it was useless to examine the bone marrow.

DR. WALSH: I cannot explain the blood picture, Mr. Chairman.

PROFESSOR H. K. WARD: Mr. Chairman, may I ask Dr. Palmer whether the pus from the kidney was cultured?

DR. PALMER: It was not cultured.

PROFESSOR WARD: What?

DR. PALMER: In defence, may I say the autopsy was not performed in Sydney Hospital?

Diagnosis.

Bilateral renal calculi with pyonephrosis; bacteriæmia; moderate pulmonary œdema.

Out of the Past.

THE CITIZENS' VIGILANCE COMMITTEE OF SYDNEY.[1]

[From the *Australasian Medical Gazette*, May, 1900.]

WAR in South Africa, Famine in India, and Pestilence in Australasia. Regarding the latter calamity, a truly beneficent and salutary awakening has taken place in Sydney on behalf of the Government, the Health, the Municipal authorities and the citizens. At a public meeting in the Town Hall held an 21st April last, a Citizens' Vigilance Committee was formed, which subsequently organised sub-committees for all parts of the metropolitan area. A deputation from the organisation waited on the Premier, and was most cordially and sympathetically received by him. He promised to provide a secretary, printing and stationery, and, what is best of all, Government influence and cooperation in carrying out any possible radical reforms suggested by the Executive Council of the Citizens' Vigilance Committee. The Postmaster General has granted the franking of letters and telegrams as well as the free use of a telephone to the head office of the Committee at the Town Hall Sydney. The Mayor, representing the Corporation of Sydney, has granted the free use of rooms and gas in the Town Hall for public meetings, committee meetings and secretarial purposes.

The Citizens' Vigilance Committee, backed as it is by the moral support of the Government, the Corporation of Sydney, the Health authorities and the inhabitants of the city, has already become a live institution, and is making its influence felt as a mighty power for combating with the plague and in influencing the public in the way of cleanliness and sanitary reform.

[1] From the original in the Mitchell Library, Sydney.

Correspondence.

THE MEDICAL TREATMENT OF MINORS.

SIR: Your explicit remarks on the recent legislation in New South Wales concerning immunization and blood transfusion of minors[1,2] should be well received. Most doctors hitherto have been uncertain of their position when the parent or guardian's permission has not been forthcoming.

There is a related issue in obstetric practice, where permission is required for operative procedures such as Cæsarean section on a woman who is under the age of 21 whose husband is also a minor. I should be interested to know whether you or any of your readers can tell me from whom consent should legally be sought under these circumstances. Further, who has the say for the baby of such parents if an operation is necessary?

Yours, etc.,

WILLIAM GARNETT.

133 Macquarie Street,
Sydney.
June 4, 1960.

GENERAL PHARMACEUTICAL BENEFITS.

SIR: The reply by the Minister for Health in response to a question by a member of the House of Representatives relating to the failure to include "Butazolidin" in the unrestricted list of "Benefits" is disturbing on close examination. To quote for the benefit of readers who may not have noticed the original:

> This drug possesses very considerable toxic qualities, and the arrangements for its supply are laid down by the Pharmaceutical Benefits Advisory Committee who, in their judgement, consider that there are indications for its use for pensioners as a benefit, but not otherwise.

Conclusions which may be drawn from this statement are: (*a*) The Minister is using the Pharmaceutical Benefits Advisory Committee as a shield in this case; we know that "Butazolidin" is expensive—are all recommendations by the Committee accepted, or does the Treasury or other Governmental body consider recommendations in the light of possible response to the Government and modify recommendations? Or (*b*) the Pharmaceutical Benefits Committee will not permit the drug to be unrestrictedly prescribed because of its toxic properties—but does not mind the odd pensioner having a hæmatemesis or developing agranulocytosis.

If the first conclusion is correct, I consider the Committee should announce this to the profession, so that we may know who is actually controlling the inclusion of drugs in the schedule.

If the second conclusion is the correct one we have immediate proof of an intolerable state of affairs—an advisory committee to the Government acting as "Big Brothers" to the profession, and saying, in effect: "We know that this drug is freely available and freely used, but we do not approve of its use and are going to have no part in encouraging its use." If this is not medical censorship, I do not know what it is.

I wonder how many more drugs have been subjected by the Committee to scrutiny to determine whether the poor chaps who have fallen off the ladder should be allowed to use them. Is "Largactil" one? Is "Cycloserine" another?

Unless we can disentangle ourselves from the web being woven ever more densely around us, we will undoubtedly

[1] MED. J. AUST., 1960, 1: 661 (April 23).
[2] MED. J. AUST., 1960, 1: 891 (June 4).

lose more and more of our professional freedom; the writing is on the wall—can we read it?

Yours, etc.,

789 Forest Road, Peakhurst, N.S.W.
May 31, 1960.

A. K. McKELLAR STEWART.

SIR: Many letters have been written about the apathy of the profession, some chiding, some despairing; but I think that in principle by far the majority of us approve of a pharmaceutical benefit scheme, although perhaps the majority of us do not approve of the mechanics of this scheme. This distresses us, and our complaint is about how effectively prescribing has been turned into a bureaucratic exercise.

Fundamentally, the system of qualities is wrong. We write a prescription for tablets, three times a day, order 100 and ask the patient to come back in a month. Superficially, then, prescriptions are concerned with numbers; but a moment's thought will discover that prescriptions are not concerned with numbers, but with durations. A doctor writes a prescription to give treatment for a length of time, and then he makes a rough calculation of the approximate number required, usually carrying on to the nearest "basic pack" to avoid broken rates.

The advisers to the Government have completely missed this point, and throw numbers at us, and in such profusion and confusion that we become baffled and enraged.

Ideally, I submit that there should be no numbers in that detestable book we all have, but durations. As an example:

Item No.	Name, etc.	Time in Days	No. of Repeats.
—	X	14	2

Then for a child or small person one may order two tablets a day, send 30 (raising to the nearest unit of 10 for convenience) or perhaps for a 230 lb. man, two tablets three times a day, send 90—much more flexible than a flat "25; 3 repeats allowed".

Such a system would be far easier to memorize than the present jumble, and the pressure of common-sense on the advisers to the Government should eventually ensure a uniform time for practically all drugs, exceptions springing to mind being high-priced drugs or drugs for chronic diseases.

Finally, Sir, I must express my disappointment, apparently generally shared, at the vast acres of medicine untouched by the therapeutics of the Pharmaceutical Benefits. There is so very, very little we can use to help in the fields of gynæcology, psychiatry and rheumatology—which fields cover a pretty fair percentage of general practice. It is no wonder we feel our patients have been cheated.

Yours, etc.,

Queen Street, Ayr, North Queensland.
May 31, 1960.

ROBERT N. NELSON.

SIR: Further efforts on the part of officialdom to implement the socialization of the profession continue to come to light. The latest may be found in the sections of instructions to practitioners in the revised booklet of regulations which came into effect on June 1. Parenthetically, it is interesting—not to say disturbing—to learn that still another set of revised regulations and list of approved drugs and prescriptions is in turn to be brought down in September.

We now find that to prescribe any drug or preparation restricted in its application to pensioners only, such prescription must be endorsed "Specified Purpose"—this, in addition to the pension number, and the magic letters "N.H.S., P.M.S.". Where is it all to end? And cannot the profession realize the threat of nationalization which hangs ever heavier and more imminent over us?

Recently one of us had a script returned by a chemist with a request that the script be rewritten. The script had been returned by the Department of Health marked "Disallowed", the reason being that in addition to the benefit prescribed, a non-benefit preparation had been prescribed on the same piece of paper.

On receipt of the latest set of instructions, one of us made inquiries to determine the reason for the above-quoted requirement of the words "Specified Purpose". It was discovered—and this may be accepted as authoritative—that this addition has been at the insistence of the Commonwealth Audit Department, whose clerks—for some reason not apparent to those of us who regard paper-work as unproductive—require and insist on these words to aid them in their costing. In other words, we are now under control by at least two Commonwealth departments—besides their various State proxies.

In the past few weeks a plebiscite was held in this State to determine the feeling of the profession as a whole to these efforts at our regimentation. While the replies indicated an overwhelming "no", it is disheartening to learn that less than 40% of our members were sufficiently interested in medical politics to bother to return their *questionnaires*. One can only assume that the majority of us are either indifferent to, or actually approve of, the shackles which are quietly but nonetheless surely being riveted more tightly on us with every revision of the regulations issued.

Yours, etc.,

The Talbot Clinic, Rockhampton, Queensland.
June 3, 1960.

D. N. EVERINGHAM,
C. W. HAMMOND,
J. E. REES.

SURGERY AND THE GENERAL PRACTITIONER AND PROFESSIONAL UNITY.

SIR: I would like to congratulate Dr. F. L. Long and Dr. Hugh T. McDonald on their letters in the Journal of May 14. We must beware!

From his student days onwards to R.M.O. status, the young student and doctor sees only dangled before him the specialist. Often, alas, the general practitioner is looked down upon and even referred to in derogatory terms. At student and R.M.O. level, more teaching for and honour given to general practice must be given.

Our big hospitals are doing a great disservice to the profession and public by retaining far too many "senior" R.M.O.'s and registrars, thus turning out more graduates who have been conditioned to specialist life only. Once a man has been thus conditioned, or obtained a fellowship of one of the Royal Colleges, general practice is forever beneath him. The best thing, as H. T. McDonald says, would be to admit no one as a specialist without five years as a general practitioner. There is extreme danger that the Royal Colleges and their too many Fellows, who are both too big and unfitted for general practice, will split the profession.

Surely the solution is (i) better training and encouragement for general practitioners; (ii) limitation of the number of registrars, thus limiting potential specialists; (iii) conditioning the specialists to a life first comprised of a mixture of general practice and specialization.

Too many hungry degree-conscious and "degree only" made specialists are probably a greater danger to the profession than governments.

Yours, etc.,

19 Gerrale Street, Cronulla.
May 30, 1960.

A. M. MACINTOSH.

SIR: It is with considerable chagrin that I note two full pages of the current issue of the *Australian Women's Weekly* devoted to an undignified wrangle between Australian doctors. Although I am the last to advocate a conspiracy of silence *vis-à-vis* the general public, I feel that the individuality of the medical practitioner should in this instance be curbed. At a time when the portents are ominous in regard to government control of medicine, and we need every bit of public support we can get, I can conceive of nothing more damaging to public relations than the spate of letters for and against what is basically an internal dispute. Every letter has a word of truth in it, and no letter contains all the truth. If we want to argue the matter out between ourselves, let us do so in the pages of our own journals without the cloak of anonymity; but let us leave the lay journals to the laity.

It is easy to see the politicians are rubbing their hands at the prospect of "divide and conquer" for I can see the

medical profession badly disunited over an issue which is basically trivial, but which can generate an inordinate amount of heat.

Let us, therefore, cease writing letters to the lay Press about medical matters, and let this shameful squabble die a natural death.

Yours, etc.,

52 Abbott Street,
Cairns,
North Queensland.
May 31, 1960.

JOHN KENNEDY.

SMALLPOX VACCINATION.

SIR: In spite of all the efforts made by public health authorities, smallpox is still a widespread disease in some tropical countries outside Australia. The spread to this country always remains a possibility, and most doctors welcome vaccination and revaccination campaigns.

Recently, however, I saw quite a number of persons being inoculated in the upper arm, without doubt the most "handy" method. I am not going to become too cosmetic-minded, but in other countries it has long since been the practice to use other sites. This applies especially to women and children. The place of choice is the lateral ankle in little children and the upper thigh in adults. Neither of these places allows unsightly scars to be obvious. Some French physicians use the sole of the baby's foot.

Yours, etc.,

Base Hospital,
Mackay,
Queensland.
June 1, 1960.

G. BEUMER.

IT HAPPENED ONE NIGHT.

SIR: In Volume I, Number 22, of May 28, 1960, of the Journal, Dr. Ion Morrison, together with Mr. A. T. Bath, have described in an article "It Happened One Night" the effect of a temperature inversion upon the population of Brisbane.

In Volume II, Number 22, of November 28, 1953, under the title of "The South-West Wind' together with the meteorological aspects by A. K. Hannay, B.Sc., I described a similar shock of allergic symptoms within the population of Sydney. In that article I discussed various possible factors, and the question of temperature inversion was included.

If Dr. Morrison has been able to prove that these temperature inversions, by the packing of pollens, moulds and other allergens within the air should cause shock symptoms, then it may be possible to anticipate results as he suggests and prepare for them.

I have noticed, since my sojourn in the Australian Capital Territory, that these temperature inversions are usually associated with the north-west winds rather than the south-west wind as in Sydney, and from my queries around the country it is the north-west wind on the western side of the mountains that is important, whereas it is the south-west wind in coastal regions. If other people in other areas could confirm these findings with regard to temperature inversion, a further factor in the complicated pattern of allergy would be defined.

Yours, etc.,

Alinga Street,
Civic Centre,
Canberra.
June 6, 1960.

CLIVE C. SANDS.

SIR: Can the author answer the following questions?

1. Overnight on April 20, 1959, the temperature inversion moved to a lower height. At what hour?

2. The graphs are labelled "altitude over Brisbane". Is it reasonable to suppose the assumed increase in atmospheric pollution applied to the wide area quoted—namely, Caboolture, Boonah, Scarborough and the Tamborine Mountains?

3. How could three asthmatics in a hospital ward wake and be given adrenaline "at exactly 11.45 p.m."? Perhaps the nurses synchronized watches and plunged in their needles after a "count down"? Is it not more likely that when one patient awoke, noise awakened the other two, who were then the victims of suggestion?

4. Why does the author limit his observations to one night? Retrospective survey would be easy; so would future research.

5. Cause and effect is one thing. Is coincidence another? That night unrecorded "seismic tremor" might have occurred. Maybe an angel lost a halo, or Mr. K. drank too much vodka and fired a satellite. Maybe the price of fish and chips in Indo-China rose suddenly.

Doctors know that most asthmatics believe cold triggers attacks. April 20, 1959, was a winter night.

More than "one night" is cold in winter, so there must be other factors involved. Dr. Morrison's article suggests that decrease in altitude of a temperature inversion increases the concentration of chemical irritants in the air we breathe. The "smog' theory is not new. The word "smog" is used in preference to "humour", lest Hippocrates and Galen become hysterical, many, many miles above (it is to be hoped) a temperature inversion.

Yours, etc.,

Post Office Box 460,
Mt. Isa,
Queensland.
June 6, 1960.

S. K. ROGERS.

Obituary.

JAMES JOSCELYN LAWRENCE.

WE are indebted to Professor H. O. Lancaster for the following notes on the late Dr. J. J. Lawrence.

James Joscelyn Lawrence, M.Sc., Ph.D., virologist at the School of Public Health and Tropical Medicine, Sydney, died in May, 1960, after a long illness. He had made many contributions to both animal and human epidemiology and parasitology. He had begun with a special interest in zoology, but later was able to turn with success to bacteriology and virology. He had a wide knowledge of many scientific fields.

GORDON HAROLD PFEIFFER.

WE are indebted to Dr. A. J. Metcalfe for the following account of the career of the late Dr. G. H. Pfeiffer.

The passing of Gordon Harold Pfeiffer was a tragedy and a personal loss to many hundreds of people. I first met him in 1913, when he came from Grafton to Fort Street Boys' High School. He won an exhibition to the University of Sydney, where he did a distinguished medical course, and later became a resident medical officer at Sydney Hospital. After a short period of army service, he left for England to study for the Fellowship of the Royal College of Surgeons. His interest was in urology, and he took every opportunity of gaining experience in this field.

After several years in England, he returned to Sydney and settled in practice at Campsie. Here he made his life work, and gradually built up a very large practice. As a surgeon on the staff of the St. George Hospital, Canterbury Hospital, Marrickville Hospital and the Masonic Hospital, he was one of the best urologists in Sydney. In his holidays he travelled extensively through Australia, and his moving pictures gave pleasure to many. He was very generous in his professional work, and his residents and many surgeons in Sydney owe him a great deal of gratitude for his training and for the opportunities afforded of doing many operations under his supervision. In the field of urology he excelled; but it is not here that he will be most remembered.

He had a big surgical practice; but in spite of the fact that he was more than reasonably occupied in his speciality, he would never refuse to see his old patients who crowded his waiting-room. He was urged by his friends to relax again and again, but he would never send away anyone needing help. This attitude was not based on any search for wealth. His card records show a surprisingly high percentage of cards marked "no fee". One of the things he most valued was a framed testimonial given to him during the financial depression of the 1930's as an expression of gratitude for unselfish devotion to his patients without the possibility of reward.

His funeral gave an amazing indication of the love of the community for him. It is only on rare occasions that one sees such a great number of the humblest citizens come out to pay homage to a man they loved. He had many devoted friends and admirers, and I was honoured by his friendship and confidence. To me and to my family he was more than a friend, and his passing leaves a gap which cannot be filled. Farewell, Gordon Pfeiffer, a well-loved, generous and noble character.

The Royal Australasian College of Physicians.

ADMISSIONS TO FELLOWSHIP AND MEMBERSHIP.

AT a meeting of the General Body of Fellows of The Royal Australasian College of Physicians, held in Melbourne on May 25, 1960, the following were elected and admitted to fellowship of the College: *Under Article 44*: Dr. F. W. A. Clements and Professor F. C. Courtice, of New South Wales; Dr. D. O. Shiels, of Victoria; Sir Geoffrey Sydney Todd, of England. *Under Article 42*: Dr. B. A. D. Curtin, Dr. R. I. Eakin, Dr. E. J. Halliday, Dr. G. L. McDonald, and Dr. J. R. Sands, of New South Wales; Dr. A. V. Jackson, Dr. H. I. Jones, Dr. L. Murphy, Dr. H. P. Taft, Dr. H. E. Williams and Dr. A. Wynn, of Victoria; Dr. R. A. Burston, Dr. J. S. Covernton, Dr. A. K. Grant, Dr. R. Hecker and Dr. J. M. McPhie, of South Australia; Dr. P. L. Dorney and Dr. F. R. T. Stevens, of Tasmania; Dr. G. F. Hall and Dr. W. J. Smith of New Zealand.

The following candidates, who were successful at an examination held in Australia, were admitted to membership of the College on May 23, 1960: Dr. O. Appenzeller, Dr. A. G. G. Bennett, Dr. L. Brenner, Dr. D. S. Child, Dr. J. M. Duggan, Dr. N. D. Gallagher, Dr. B. Haneman, Dr. A. M. Lloyd, Dr. M. S. Owen, Dr. B. J. Pascoe, Dr. R. A. Royle and Dr. J. D. Wingfield, of New South Wales; Dr. H. G. Burger, Dr. K. Catt, Dr. B. S. Faragher, Dr. J. E. Fitzgerald, Dr. J. Hansky, Dr. A. K. Lethiean, Dr. I. G. Lyall, Dr. J. F. O'Callaghan, Dr. S. F. Phillips, Dr. J. G. Sloman and Dr. R. R. W. Townley, of Victoria; Dr. J. T. Andrews, Dr. G. T. Ey and Dr. A. J. Watson, of South Australia; Dr. K. R. Hayes, and Dr. K. P. Kennedy, of Queensland; Dr. B. R. Beveridge and Dr. B. A. Kakulas, of Western Australia.

Dr. K. F. Anderson of South Australia, Dr. G. M. Watson, of New South Wales, and Dr. Saul Wiener, of Victoria, were admitted to Membership under the provisions of Article 37.

EXAMINATION FOR MEMBERSHIP.

THE next examinations for membership of The Royal Australasian College of Physicians will be held on the following dates: written examination (capital cities), Friday, August 26, 1960; clinical examination (Sydney), commencing on or about Monday, October 5, 1960. Application forms may be obtained from the Honorary Secretary, 145 Macquarie Street, Sydney, and applications should be lodged with the Honorary Secretary not later than Friday, July 29, 1960.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Conference of Medical Journalism.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that a Conference on Medical Journalism in Australia and New Zealand will be held in Sydney from Wednesday, October 26, to Friday, October 28, 1960.

The objects will be the improvement of medical journals and medical writing generally and consideration of future developments in this field. The conference is designed to be of value to all interested in the reading, writing and publishing of medical work. It will be attended by the editorial staffs of the established medical journals and by representatives of all branches of medicine.

All interested are invited to attend. Applications for enrolment, accompanied by the registration fee of one guinea, should be forwarded to the Honorary Director, The Post-Graduate Committee, 131 Macquarie Street, Sydney.

Course in Anæsthetics for General Practitioners.

The Post-Graduate Committee in Medicine in the University of Sydney announces that a course in anæsthetics will be conducted by the Department of Anæsthetics and Resuscitation at Sydney Hospital for two weeks from November 14 to 26, 1960. The course will be full-time, from 9 a.m. to 6 p.m. daily, consisting of practical demonstrations and tutorials under the supervision of Dr. Douglas Joseph. Enrolments will be limited to four, and applicants should submit particulars of their anæsthetic experience and requirements. It is regretted that, for the present, this course is open only to applicants from New South Wales. The closing date for applications is June 30, 1960, and the selection of candidates will be announced shortly after this date. The fee for attendance is £12 12s., payable after selection date. Application should be made on the prescribed form, which is available on request to the Course Secretary, Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. Telephones: BU 4497-8. Telegraphic Address: "Postgrad. Sydney".

ST. VINCENT'S HOSPITAL, SYDNEY.

Gastro-Enterology Unit.

THE next meeting of the Gastro-Enterology Unit will be held at St. Vincent's Hospital, Sydney, on Thursday, June 30, 1960, at 5.30 p.m. Mr. N. C. Newton will speak on "Hiatus Hernia". All medical practitioners are cordially invited to attend.

Surgical Seminar.

A surgical seminar will be held in the Students' Lecture Theatre, fifth floor, St. Vincent's Hospital, Sydney, on Monday, June 27, 1960, at 5.15 p.m. Mr. Justin Fleming will speak on "Aortic Occlusion, Aneurysm and Femoro-Popliteal Block". All medical practitioners are cordially invited to attend.

Notes and News.

Summer School in Health Education.

The Central Council for Health Education announces that the Summer School in Health Education will be held in London from August 9 to 19, 1960. The title of the school is "Making Health Matter", and among the topics to be discussed will be juvenile delinquency, the community care of the mentally ill, recent progress in medicine, and the problems of public health workers. Inquiries and applications to attend should be addressed to the Medical Director, The Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1.

Immunization against Poliomyelitis, Diphtheria and Influenza.

Eradication of poliomyelitis as a practical possibility has been foreshadowed by V. M. Zhdanov, Academic Secretary, Academy of Medical Sciences of the USSR, who was chairman of the technical discussions of the Thirteenth World Health Assembly held in Geneva in May, 1960. Details of his remarks are contained in a statement recently supplied by the World Health Organization. Drawing a parallel with diphtheria, Professor Zhdanov pointed to the fact that experience in many European countries, such as Britain, France and the Scandinavian countries, and in many cities and localities in the Soviet Union and the United States of America, showed that correctly organized and systematically carried out immunization and re-immunization of children against diphtheria led to the practical eradication of the infection among the population. In principle, Professor Zhdanov continued, it should be possible to obtain similar results with poliomyelitis. Although, even a few years ago, it was still not realistic to hope for eradication, the living poliovirus vaccine now available increased resistance of the cells, thus hindering multiplication of the virus. That should lead to diminished circulation of the

virus and, if a large percentage of the population was immune, would bring about conditions similar to those achieved in the case of diphtheria.

The practical eradication of diphtheria Professor Zhdanov characterized as "a distinctive conversion of quantity into quality'. He said that the high degree of immunity enjoyed by the bulk of the population not only prevented the contraction of diphtheria but also sharply reduced the opportunities for its causative agent to circulate.

Professor Zhdanov said that they were awaiting with impatience the results of the immense programme of immunization against poliomyelitis (in Russia), in the course of which it was intended in six months or a year to administer the vaccine to not less than 80,000,000 persons. If the experiment proved truly satisfactory, it would answer the question of whether it was possible to eradicate poliomyelitis, at any rate for practical purposes, by means of mass immunization of the population."

In the case of influenza, which Professor Zhdanov described as "perhaps the only truly world-wide infection", he was not so optimistic. For various reasons, Professor Zhdanov explained, even if the great scientific and organizational difficulties could be overcome, large scale vaccination was not the effective answer, as it might prove to be in the case of poliomyelitis. The influenza problem would not be finally resolved, in his view, until other methods of control were discovered, such as special types of antibiotics; those, he emphasized, did not at present exist.

Professor Zhdanov also had a word of sympathy for children. He pointed out that modern life was such that every newborn human being was faced with the dilemma either of suffering from numerous and almost inescapable infections at the most vulnerable age, that of childhood, or of submitting to numerous and often painful immunization procedures to provide protection against them.

New Managing Director.

Mr. David H. Crombe, who has been Managing Director of Merck Sharpe & Dohme (Australia) Pty. Limited since 1956, has advised that Mr. John S. Baker has been appointed Managing Director of the Australian subsidiary of Merck & Co. Inc., U.S.A. Mr. Crombe advises that Mr. Baker's appointment now gives Merck Sharpe & Dohme (Australia) Pty. Limited a completely Australian managed and staffed organization. Mr. Baker was previously Works Director for the company and is a graduate chemical engineer from the Sydney Technical College. Mr. Crombe has been appointed president of Merck & Co. Limited, the Company's Canadian organization.

British Medical Association (N.S.W. Branch) Annual Ball.

The fifth annual ball of the N.S.W. Branch of the B.M.A. will be held at 9 p.m. on Wednesday, July 20, 1960, at the Trocadero, George Street, Sydney, in the distinguished presence of His Excellency the Governor of N.S.W., Sir Eric Woodward, and Lady Woodward. It is hoped that there will be a large attendance of members. Tickets may be obtained from the Medical Secretary of the Branch at a cost of £2 2s. (single). Table bookings, which may be made at the Trocadero, are to be made in a member's name.

Royal Australasian College of Surgeons.

VICTORIAN STATE COMMITTEE: POST-GRADUATE COURSE IN SURGERY.

THE Victorian State Committee of the Royal Australasian College of Surgeons is arranging a course of instruction in post-graduate surgery, to be held in Melbourne from August 8 to October 14, 1960. The course will be full time. During the mornings entrants will, with some restrictions, be able to attend and observe the work in the various clinical schools. Tuition will begin each week day at 2 p.m., and at 4 p.m. on each day there will be a session on clinical surgery. The course has been so arranged to enable anyone who wishes to do so to take off 11 weeks prior to the Final Examination for the F.R.A.C.S. in October, to prepare for this examination. In addition, the clinical instruction is being conducted in the late afternoons, in order that senior resident medical officers may be able to attend this part of the course. The fees for the course are (i) full time, 20

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED MAY 21, 1960.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1	..	2	..	..	..	..	..	3
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	..	..	..	..	3	..	3
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	1	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	2(1)	11(9)	..	..	2(2)	..	6	1	22
Diphtheria	..	..	..	..	..	..	..	..	..
Dysentery (Bacillary)	..	12(12)	..	1	2(2)	..	1	..	16
Encephalitis	..	..	..	1	..	..	..	..	1
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	1	..	..	1
Infective Hepatitis	39(10)	25(15)	8	8(8)	3(2)	1	..	1	85
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	1	..	..	..	..	..	1
Malaria	..	..	1	..	1(1)	..	..	..	2
Meningococcal Infection	1(1)	..	..	..	..	..	..	..	1
Ophthalmia	..	..	..	..	5	..	..	..	5
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	..	..	..	..	..	..	..	..
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	4(2)	..	3(1)	1	..	..	..	8
Salmonella Infection	..	..	..	..	1(1)	..	..	..	1
Scarlet Fever	3(1)	20(17)	..	4(1)	..	..	..	..	27
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	2(1	..	..	..	..	..	2
Trachoma	..	..	..	..	..	..	3	..	3
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	38(15)	7(5)	20(5)	2(1)	6(4)	3(1)	1	..	77
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	1	..	..	..	..	..	..	..	1
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

guineas; (ii) clinical only, 10 guineas. Entries for the course close on July 22, 1960. Applications should be directed to the Honorary Secretary of the Victorian State Committee of the Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1. Candidates when entering must forward a remittance for the fee—20 guineas or 10 guineas as the case may be—plus exchange, in the case of candidates resident in Australia, for cheques drawn on banks outside Melbourne. Candidates resident in New Zealand or elsewhere should remit by bank draft drawn on Melbourne in favour of the Royal Australasian College of Surgeons, and payable in Australian currency.

Honours.

BIRTHDAY HONOURS.

HER Majesty the Queen has been pleased to confer the following honours on Australian medical practitioners:

Lady Mary Ranken Herring, of Melbourne, has been created a Dame Commander of the Most Excellent Order of the British Empire.

Dr. Henry McLorinan, of Melbourne, has been created a Commander of the Most Excellent Order of the British Empire.

Colonel John George Glyn White, O.B.E., of Melbourne, has been created a Commander of the Most Excellent Order of the British Empire (Military Division).

Dr. Cyril Fortune, of Perth, Dr. Trevor Claude James, of Hobart, Dr. Winifred Barbara Meredith, of Melbourne, and Dr. Charles Emanuel Williams, of Mackay, Queensland, have been created Officers of the Most Excellent Order of the British Empire.

Dr. Walter Watson Feather, of Roma, Queensland, has been created a Member of the Most Excellent Order of the British Empire.

Dr. George Douglas Robb, C.M.G., of Auckland, New Zealand, has been created a Knight Bachelor.

The World Medical Association.

AID TO EARTHQUAKE VICTIMS.

The Secretary-General of the World Medical Association has announced that Dr. Ernst Fromm, Treasurer of the Association, transmitted a cheque for $1000 to the Secretary of the Colegio Médico de Chile, to be used to provide medical assistance and relief to the earthquake victims in Chile. Medical associations and doctors of the world are urged to provide medical supplies and funds for the relief of these victims. Donations should be addressed to the following: Dr. Rolando Castanon, Colegio Médico de Chile, Miraflores No. 464, Santiago, Chile.

University Intelligence.

UNIVERSITY OF MELBOURNE: FACULTY OF MEDICINE.

The Faculty of Medicine, at its meeting on May 19, 1960, adopted the recommendation of the Board of Examiners that Dr. Saul Wiener, of the Commonwealth Serum Laboratories, Melbourne, be admitted to the degree of doctor of medicine by thesis only. Dr. Wiener's thesis was entitled "Studies in Animal Venoms".

Nominations and Elections.

THE undermentioned have applied for election as members of the South Australian Branch of the British Medical Association:

Dainius, Vytautas Peter, M.B., B.S., 1958 (Univ. Adelaide), Meningie, South Australia.

McKinnon, Donald Campbell, M.B., B.S., 1957 (Univ. Adelaide), 12 Lanor Avenue, Goodwood Park.

Deaths.

THE following deaths have been announced:

BARDSLEY.—Ernest Alexander Bardsley, on June 9, 1960, at Sydney.

CORLETTE.—Cyril Ernest Corlette, on June 14, 1960, at Watson's Bay, New South Wales.

Diary for the Month.

JUNE 28.—Tasmanian Branch, B.M.A.: Southern Subdivision.
JUNE 28.—New South Wales Branch, B.M.A.: Hospitals Committee.
JUNE 29.—South Australian Branch, B.M.A.: Annual Meeting.
JUNE 30.—Tasmanian Branch, B.M.A.: Northern Subdivision.
JUNE 30.—New South Wales Branch, B.M.A.: Branch Meeting.
JULY 1.—Queensland Branch, B.M.A.: General Meeting at Townsville in conjunction with Townsville Local Medical Association.
JULY 5.—New South Wales Branch, B.M.A.: Council Quarterly.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

Authors of papers are asked to state for inclusion in the title their principal qualifications as well as their relevant appointment and/or the unit, hospital or department from which the paper comes.

References to articles and books should be carefully checked. In a reference to an article in a journal the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of article. In a reference to a book the following information should be given: surname of author, initials of author, year of publication, full title of book, publisher, place of publication, page number (where relevant). The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this Journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in Australia can become subscribers to the Journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £6 *per annum* within Australia and the British Commonwealth of Nations, and £7 10s. *per annum* within America and foreign countries, payable in advance.

DOES NOT CIRCULATE

THE UNIVERSITY OF MICHIGAN
AUG 4 1960
MEDICAL LIBRARY

THE MEDICAL JOURNAL OF AUSTRALIA

Vol. I.—47th Year SYDNEY, SATURDAY, JUNE 25, 1960 No. 26

CONTENTS

ORIGINAL ARTICLES— Page

John Woodall, an Elizabethan Surgeon, by J. Estcourt Hughes .. 1001
Superficial Mycoses in Melbourne, by Mary Morton .. 1006
Some Aspects of Drug Resistance in Tuberculosis and its Treatment, by S. Gillis .. 1014
Preanæsthetic Sedation for Children, by Geoffrey Cornish and Douglas Galbraith .. 1020
Anti-Rh$_o$(D) Antibodies Produced by Iso-immunization in an Rh-Positive Mother of the Unusual Genotype R^1r^y (CD^{e}e/CdE), by R. T. Simmons and Vera I. Krieger .. 1021

REPORTS OF CASES—

Hypopituitarism a Cause of Refractory Anæmia, by W. Hamilton Smith .. 1022
Post-Partum Broad Ligament Hæmatoma, by Jean Murray-Jones .. 1025
Miliary Tuberculosis at the Extremes of Life, by Leslie Williams .. 1026

REVIEWS—

The Premature Baby .. 1027
Surgery in Infancy and Childhood .. 1027
Whillis's Elementary Anatomy and Physiology 1027
Surgery of the Colon .. 1028
Cryptorchism .. 1028

BOOKS RECEIVED .. 1028

LEADING ARTICLES—

Medical Research in Australia .. 1029

CURRENT COMMENT—

Monkey into Space .. 1030
Thirteenth World Health Assembly .. 1031
Marriage and Divorce .. 1031

ABSTRACTS FROM MEDICAL LITERATURE—

Pædiatrics .. 1032
Psychiatry .. 1032
Neurology .. 1033

RESEARCH—

Research Projects in Medicine and Allied Sciences in Australia .. 1034

CLINICO-PATHOLOGICAL CONFERENCES— Page

A Conference at Sydney Hospital .. 1040

OUT OF THE PAST .. 1043

CORRESPONDENCE—

The Medical Treatment of Minors .. 1043
General Pharmaceutical Benefits .. 1043
Surgery and the General Practitioner and Professional Unity .. 1044
Smallpox Vaccination .. 1045
It Happened One Night .. 1045

OBITUARY—

James Joscelyn Lawrence .. 1045
Gordon Harold Pfeiffer .. 1045

THE ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS—

Admissions to Fellowship and Membership .. 1046
Examination for Membership .. 1046

POST-GRADUATE WORK—

The Post-Graduate Committee in Medicine in the University of Sydney .. 1046
St. Vincent's Hospital, Sydney .. 1046

NOTES AND NEWS .. 1046

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA .. 1047

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS—

Victorian State Committee: Post-Graduate Course in Surgery .. 1047

HONOURS—

Birthday Honours .. 1048

THE WORLD MEDICAL ASSOCIATION .. 1048

UNIVERSITY INTELLIGENCE .. 1048

NOMINATIONS AND ELECTIONS .. 1048

DEATHS .. 1048

DIARY FOR THE MONTH .. 1048

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 1048

EDITORIAL NOTICES .. 1048

PUBLISHED WEEKLY :: PRICE THREE SHILLINGS

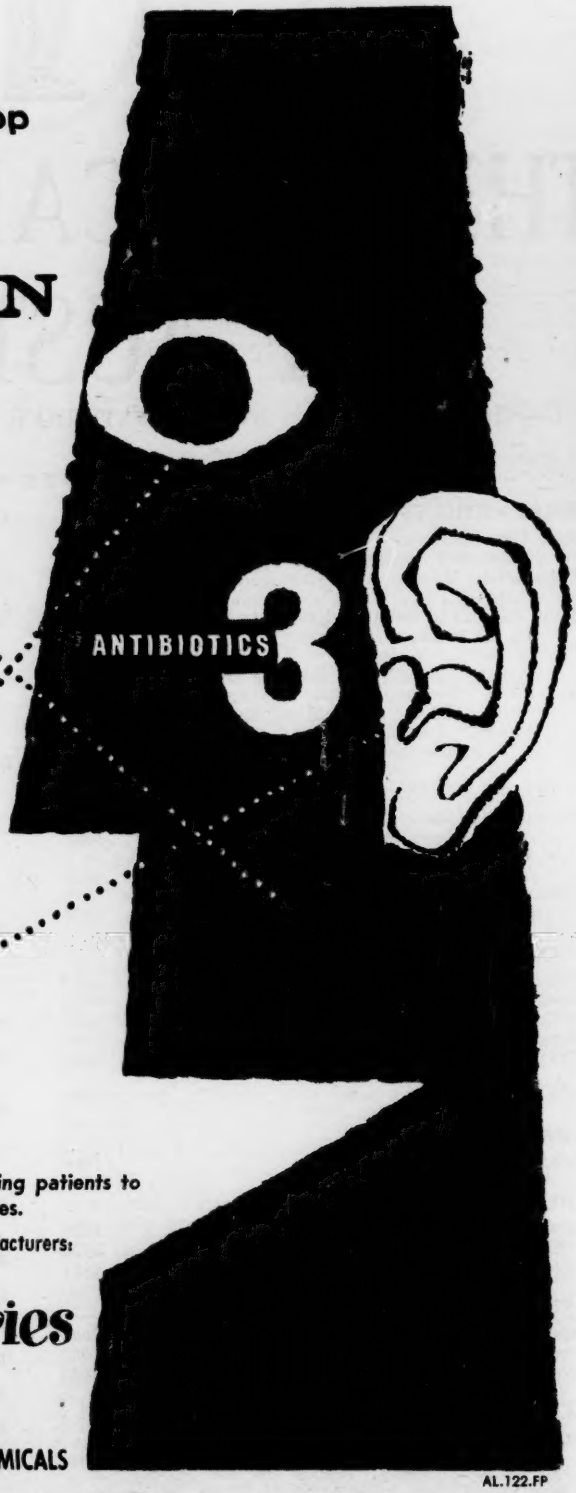
Registered at the G.P.O., Sydney, for transmission by post as a newspaper.

After **6** years still on top for topical application.

ANDREWS' NEOTRACIN

A wide spectrum combination

BACITRACIN, NEOMYCIN SULPHATE AND *POLYMYXIN B SULPHATE.*



For the skin, NEOTRACIN OINTMENT.
Available in ¼, ½ and 1-oz. tubes.

N.H.S. ITEM No. 629
For the eye, NEOTRACIN OPHTHALMIC *OINTMENT. Available in 60 gr.* tubes with applicator tip.

For the ear, NEOTRACIN OTIC DROPS.
In ½-fl.-oz. bottles with dropper.

For Disinfection in Surgery,
NEOTRACIN ANTIBIOTIC SPRAY
In 4 fl. oz. pressurized containers.
NEOTRACIN DUSTING POWDER
In 5 and 15 G. puffer packs.

Neotracin offers topical application without sensitising patients to antibiotics used systemically for more serious diseases.

Further literature and information on request from the manufacturers:

Andrews Laboratories
Pty. Ltd.

15 HAMILTON STREET, SYDNEY

MANUFACTURERS OF DRUGS AND FINE CHEMICALS

AL.122.FP

"In general practice at least 40% of patients have symptoms of functional disorder..."

Lancet (1958) 1, 525

Bellergal Retard

BY SANDOZ

in functional disorders

1 tablet night and morning for **continuous** control of symptoms

mg total alkaloids of belladonna
mg Ergotamine Tartrate B P
mg Phenobarbitone B.P

Sandoz Australia Pty. Ltd

G.P.O. BOX 5318
Sydney

TAB. COLCHICO

for chronic and intercritical gout

Each tablet contains :—
Colchicine Alkaloid gr. 1/240
Acetylsalicylic Acid gr. 5
Guaiacol Carbonate gr. 2
Recommended dosage : 1-2 tablets three times daily.

TAB. COLCHICINE (M.R.) 1/120 GRS.

for acute gout (also available enteric coated)

Recommended dosage : 1 tablet every 60-90 minutes ; a severe attack may require 8-16 tablets, the average being 10. Nausea, diarrhoea and vomiting suggest adequate dosage, and the aim in the future attacks should be a little less than adequacy. Joint pains should subside withing 24-48 hours. If combined with salicylate, 50-100 grains of the latter are required each day.

Literature and samples on request to ;—

Medical Research Pty. Ltd., P.O. Box 9, Lane Cove, N.S.W.

MR

FOR ALL TYPES OF INDUSTRIAL BURNS

paxyl

ANAESTHETIC
ANTISEPTIC
ANTIPRURITIC CREAM

Paxyl contains

ANAESTHETIC

Xylocaine Astra
first reported by Lofgren, 1948, as superior to Procaine in efficiency and safety. Subsequent clinical trial fully confirms advantages of Xylocaine over other existing Cocaine substitutes. Xylocaine by comparison is approximately three times as rapid in action, three times as safe, and has three times the duration of effect.

ANTISEPTIC

Benzalkonium Chloride. One of the most powerful germicidal compounds known. Non-irritant, prevents infection of the damaged tissues. Selected after extensive bacteriological evaluation in comparison with other bactericidal compounds.

HEALING AGENTS.

Vitamin A. Promotes healing of epithelial tissue and favours the action of Allantoin, which stimulates proliferation of new cells, i.e. the growth of granulation tissue over which the epithelial tissue spreads.

In a specially prepared base.....
PAXYL is available in 1 oz. and 4 oz. tubes

Burns: Paxyl accelerates improvement under general treatment by relieving the symptoms and promoting local healing. It provides both immediate relief and complete and rapid healing of burns from contact with hot and molten metal, acid and boiling water.

Dermatitis: Chronic and subacute. Symptoms always relieved promptly and for many hours. "Great improvement" reported in 60% of cases. Contact Dermatitis relieved and healed in non-sensitised cases.

Pruritus: promptly relieved. Recovery dependant on removal of initiating cause, which is usually not local. In the same category are varicose Eczema and Neuro-Dermatitis.

Prepared by the Pharmaceutical Division of

F. H. FAULDING & CO. LTD.
ADELAIDE · PERTH · SYDNEY
MELBOURNE · BRISBANE

Under licence to ASTRA Pharm. (Australia) Pty. Ltd. Brisbane

deep skin penetration in arthritis and rheumatism

Nicotinic, salicylic and p-aminobenzoic acids in ester form

British doctors have for some time recognized the importance of deep skin penetration in cases of soft tissue rheumatism and arthritic disorders. Tests* have shown that the esters of nicotinic, salicylic and p-aminobenzoic acids readily pass the skin barrier in therapeutic quantities, and so make possible an effective concentration of drugs at this deeper level.

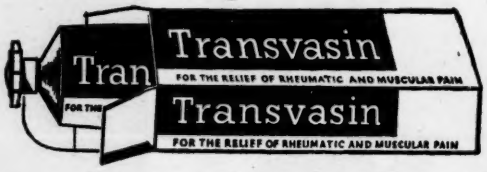
These three esters have now been successfully combined in Transvasin. Transvasin not only induces vasodilatation of the skin with superficial erythema, but also brings about a deep hyperaemia of the underlying tissues.

Transvasin is non-irritant and can safely be used on delicate skins. It is now being widely prescribed, with successful clinical results. Since a very small quantity is sufficient for each application, the cost of treatment is extremely low.

* *Therapeutische Umschau, 1952, 8, 143*

Transvasin IS MANUFACTURED BY LLOYD-HAMOL AND DISTRIBUTED IN AUSTRALIA BY MUIR & NEIL PTY. LTD., 479 Kent St., SYDNEY.

Salicylic acid tetrahydrofurfuryl-ester	14%
Nicotinic acid ethyl-ester	2%
Nicotinic acid n-hexyl-ester	2%
p-Aminobenzoic acid ethyl-ester	2%
Water-miscible cream base ad	100%



LP4A

FOR FREE SAMPLE OF TRANSVASIN AND LITERATURE, WRITE TO MUIR & NEIL PTY. LTD.

in premenstrual tension

STELAZINE*

helps to restore emotional stability
returns appetite and sleep patterns to normal
combats anxiety and nervous tension —
without making the patient feel drowsy or depressed

Available in 1 mg. tablets in containers of 25 and 250 and in 1 ml. ampoules each containing 1 mg. 'Stelazine', in packs of 12. For severe mental illness 5 mg. tablets are available.

FORMULA:
2-trifluoromethyl-10-(3'[1"-methyl piperazinyl-4"]-propyl) phenothiazine dihydrochloride

Smith Kline & French Laboratories (Australia) Ltd
(Incorporated in England)
Corner Denison & Spring Streets, N. Sydney, NSW

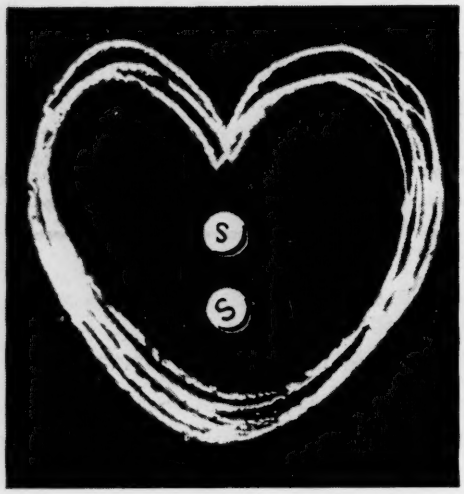
* 'Stelazine' (trade mark) brand of trifluoperazine

SZL:PA90A

Praenitron

protracted

AVAILABLE
N.H.S. ITEM 873



one tablet in the morning
one tablet at night

Schering

for long-acting prophylaxis of angina pectoris

Presentation
Bottles Containing
100 x 7 mg. Tablets

SCHERING A.G. BERLIN (GERMANY)
DISTRIBUTORS: SCHERING PTY. LTD., 620 HARRIS STREET, ULTIMO, SYDNEY

NEW ANTI-ANXIETY AGENT
OF EXTRAORDINARY EFFECTIVENESS

SEVINOL

Fluphenazine
TABLETS

0.25 MG.

All of your patients with anxiety symptoms will realize a greater measure of unharassed and productive living

- **SIDE EFFECTS MINIMAL AND RARE**
- **LONG DURATION OF ACTION HENCE CONVENIENT TWICE DAILY DOSAGE**
- **WITHOUT SIGNIFICANT DEPRESSANT EFFECT OR IMPAIRED ALERTNESS**

Packaging: *Sevinol Tablets 0.25 mg. — Bottles of 20 and 100*

FURTHER DETAILS AND SAMPLES GLADLY SUPPLED

SCHERING CORPORATION U.S.A.

- **Australian Affiliate — Essex Laboratories Pty. Ltd., Box 4058 G.P.O., Sydney**

S140/FP

CHANGE OF NAME as from 1st July

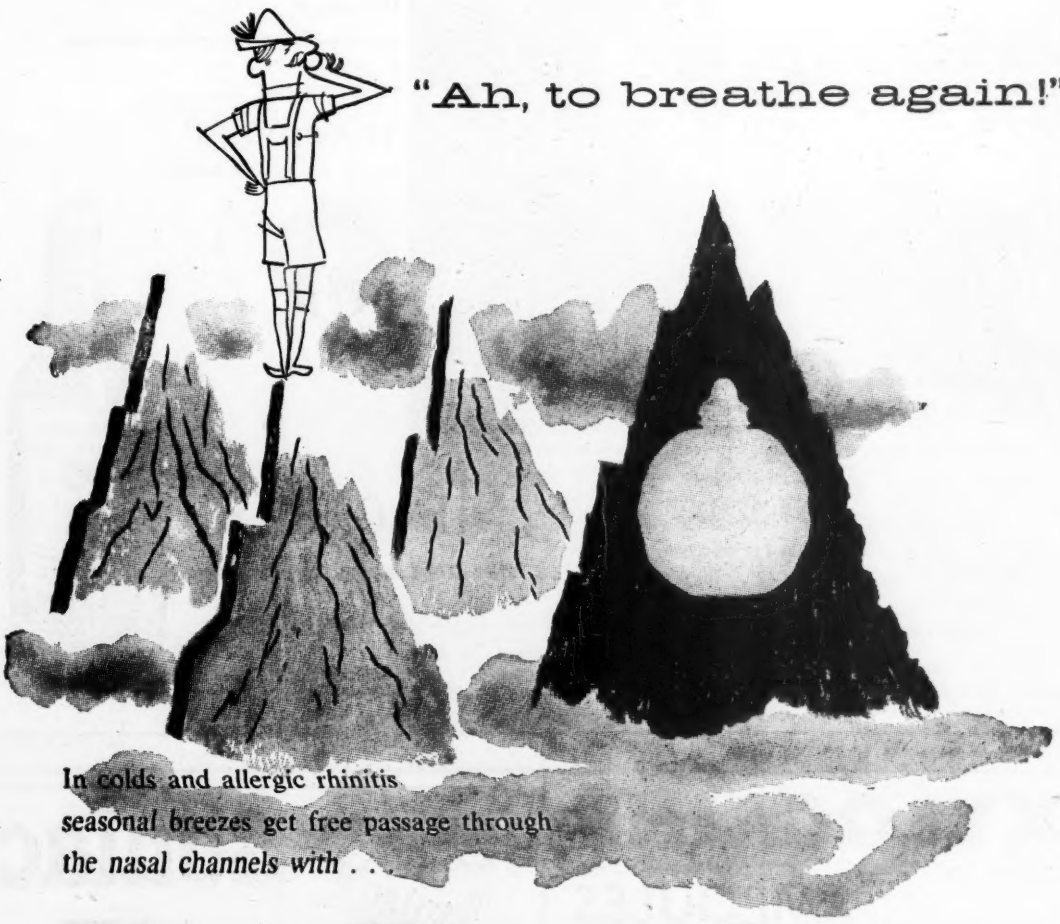
CORTODERM becomes **CORTO-CALAMINE**

CORTODERM-*N* becomes **CORTO-CALAMINE-*N***

These changes of name have been made to eliminate any possibility of confusion between our products and those of other manufacturers. Corto-Calamine and Corto-Calamine-N are distinguished from other hydrocortisone creams by the characteristic pink colour imparted by the Lacto-Calamine base. Formulations and packings remain unchanged.

Samples and literature are freely available on request.

THE CROOKES LABORATORIES LIMITED • 376 Eastern Valley Way, Roseville, N.S.W.



In colds and allergic rhinitis
seasonal breezes get free passage through
the nasal channels with . . .

Neo-Synephrine
HYDROCHLORIDE

NASAL SPRAY

PLASTIC SQUEEZE BOTTLE
with the micromist spray

The snug little bottle will not break or spill . . .
stays with patients when they need it.

Supplied in four convenient dosage forms:
¼%, ½%, Neo-Synephrine Thenfadil, and NTZ.

New
"Syndromatic" Control of the Common Cold and Allergic Rhinitis Orally
Neo-Synephrine Compound Cold Tablets

Winthrop LABORATORIES
Division of Sterling Pharmaceuticals Pty. Limited
Sydney, Australia

4A 88

Sam Richardson. Twice pro champion of Aust. Seven times foursomes champion of N.S.W.

IN GOLF . . .
EXPERIENCE IS THE GREAT TEACHER

IN SCOTCH . . .
TEACHER'S
IS THE GREAT EXPERIENCE

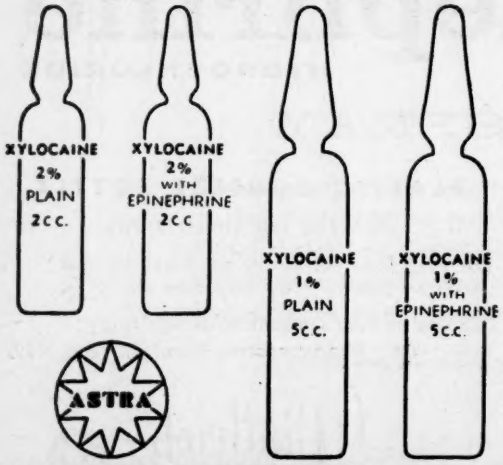
Only long experience could produce Scotch of such unvarying quality and good taste as Teacher's Highland Cream. Today, as since 1830, the Teacher family still personally supervises the making of this world famous product of Scotland.

TEACHER'S
HIGHLAND CREAM
Scotch Whisky

Agents:— N.S.W.: Tucker & Co. Pty. Ltd., Sydney. Victoria: C. & E. Baitz, Melbourne. Queensland: The Australian Estates Company Ltd., Brisbane. S. Australia: Goldsbrough Mort & Co. Ltd., Adelaide.

TW5-57N.855C.

XYLOCAINE
now in . . . (The Original Lignocaine)
AMPOULES
A Supplementary to Multi-dose Vials



ASTRA PHARMACEUTICALS (AUST.) Pty. Ltd.
ROCKLEA EAST, BRISBANE

Distributed by
COMMONWEALTH DENTAL SUPPLY COY. Pty. Ltd., BRISBANE

Bonlac
NON-FAT
POWDERED
MILK

HIGH IN PROTEIN : LOW IN FAT

* For all normal periods of growth, pregnancy and lactation, and for all other times when diet demands an increase in proteins.
* Being low in fat content, Bonlac is ideal where fat in diets is undesirable.

General Analysis of Bonlac (non-fat)

Moisture	2.00	Fat	1.00
Lactose (Carb.)	47.00	Ash	8.00
Protein	42.00		

Bon.3544A

A product of TRUFOOD of AUSTRALIA LTD.

unvarying purity . . .

precise strength . . .

These qualities of 'Wellcome' brand Insulins are due, not to chance, but to the maintenance of untiring research and the most rigid standards of manufacture.

Burroughs Wellcome & Co., associated with the manufacture of Insulin since the earliest days of its discovery, were first to issue a product prepared from pure crystalline insulin.

Today, a complete range to cover the whole field of insulin therapy is issued under the 'Wellcome' label; the majority of these are processed in Sydney from crystalline insulin supplied by our London Associated Company.

Wherever medicinal products are used, the 'Wellcome' trade mark is recognised throughout the world as a guarantee of purity and fine quality.

'WELLCOME' BRAND INSULINS

Available as a Pharmaceutical Benefit

Burroughs Wellcome & Co. (Australia) Ltd., Sydney

THYAL

THYAL

A solution of a bacteriostatic agent (mercurithio-salicylate), 1/12 gr. per fluid ounce in a volatile ether-alcohol base.

for ACNE VULGARIS

Sebum, in the duct orifices, impregnated with Thyal, remains bacteriostatic and bactericidal for days—owing to Thyal's persistent activity. With regular use reinfection is prevented, and as this is the main reason for the persistence of acne, the condition is often abolished.

Thyal is not intended for other types of acne not characterized by follicular plugging.

(D.H.A.)

Method of Using THYAL

Apply Thyal morning and night. Well saturated cotton wool swabs are used and any area where there is a discharge of free pus must be cleaned first and the swab discarded immediately. Pustules with yellow heads may be opened with a sterile needle, but only light pressure must be applied to express the pus. Pustules so opened do not leave visible scars, while those which are unopened often do.

Severe cases respond within three months, improvement being seen within a few weeks. Mild cases respond quickly and should be cured within one month. All factors tending to produce a hypersecretion of sebum should be investigated and controlled, as it is important to retain the sebaceous plug which is impregnated with the bactericidal agent. Treatment should be continued for at least one month after the acne is cured.

Instruction slips are available in pads, perforated so that the product name does not appear. Pads are obtainable through D.H.A. representatives or State offices.

PRECAUTION! As with all mercurial preparations, there is the possibility of irritation or even dermatitis, especially in certain individuals. Should irritation occur, the use of Thyal should be discontinued.

Available in bottles of 4 fluid ounces.

SAPODERM

SAPODERM

SOAP *(D.H.A.)*

(Hexachlorophene 2%) in large 5-oz. cakes

An adjuvant in acne, dandruff and in all skin infections

Hexachlorophene is bacteriostatic and bactericidal to S. aureus, Strep. viridans and various Gram-positive cocci.[1]

A three-minute scrub is as effective as ten minutes with plain soap.[2]

240 patch tests—all negative.[1]

[1] Traub, E. F., Newhall, C. A., Fuller, J. R., "Surg., Gynec. & Obst.", 1944, LXXIX, 205.

[2] Dull, J. A., Tintel, H. A., Ellis, J. L., and Nicholls, A., "Surg., Gynec. & Obst.", 1950, LX.

Distributed throughout Australia by all D.H.A. Houses

NEW FORMULA

'LIPOSTABIL' TRADE MARK — now with significantly increased phospholipid in each capsule

The improved formulation offers these advantages:

- Increased content per av. daily dose (6 capsules) provides significant quantity of unsaturated fat.
- Deletion of sorbitol derivative and theophylline thiocyanate compound reduces risk of nausea even when patients are on greater-than-normal dosage.
- U.K. reports indicate that the subjective improvement noted in many patients on the older formula 'LIPOSTABIL', is equally evident in the treatment with the new.
  Pyridoxine has been added because there is evidence that it has a protective effect against arterial lipid deposits.

'LIPOSTABIL' *is indicated*

1. For prophylaxis against the development of atheroma.
2. For the treatment of clinical atherosclerosis and its sequelae:
   (a) Cardiac angina,
   (b) Intermittent claudication due to atherosclerosis,
   (c) Atherosclerotic confusional states in older people.

Each capsule of 'LIPOSTABIL' now contains Alpha-and-Beta-lecithins of soya bean 200 mg. Pyridoxine 1.5 mg.

A Nicholas N Product

Manufactured by arrangement with Nattermann et Cie, Cologne.

NICHOLAS PTY. LTD. 699 Warrigal Road, Chadstone, S.E.10, Victoria and at Sydney, Brisbane, Adelaide, Perth, Hobart

E602/908

VEECILLIN®

(CALCIUM PENICILLIN V)

ORAL SUSPENSION

contains, in each teaspoonful (3.5 c.cs.), 125 mg. microfine Calcium Phenoxymethyl Penicillinate suspended in a bland, neutral, flavoured base. VEECILLIN ORAL SUSPENSION is packed in 3 fl. oz. bottles each containing 60 c.cs. (2 fl. oz. plus), to enable easy dispersion by shaking and the withdrawal of 16 teaspoonful doses.

Available as a General Pharmaceutical Benefit for patients under the age of 10 years.

WILD STRAWBERRY FLAVOUR

Also available as a General Pharmaceutical Benefit:

VEECILLIN®

(POTASSIUM PENICILLIN V)

TABLETS

60 mg. (100,000 units), packages of 24, 100 and 500
125 mg. (210,000 units), packages of 24, 100 and 500
250 mg. (420,000 units), packages of 12, 100 and 500

Charles McDonald

MAKERS OF ETHICAL PHARMACEUTICAL SPECIALTIES

CARINGBAH, N.S.W., AUSTRALIA

Manufactured under Licence (Australian Patents Nos. 160467 and 166185).

C.M. PRODUCTS ARE AUSTRALIAN MADE AND AUSTRALIAN OWNED

prescribe . . .

℞ TUSSINOL

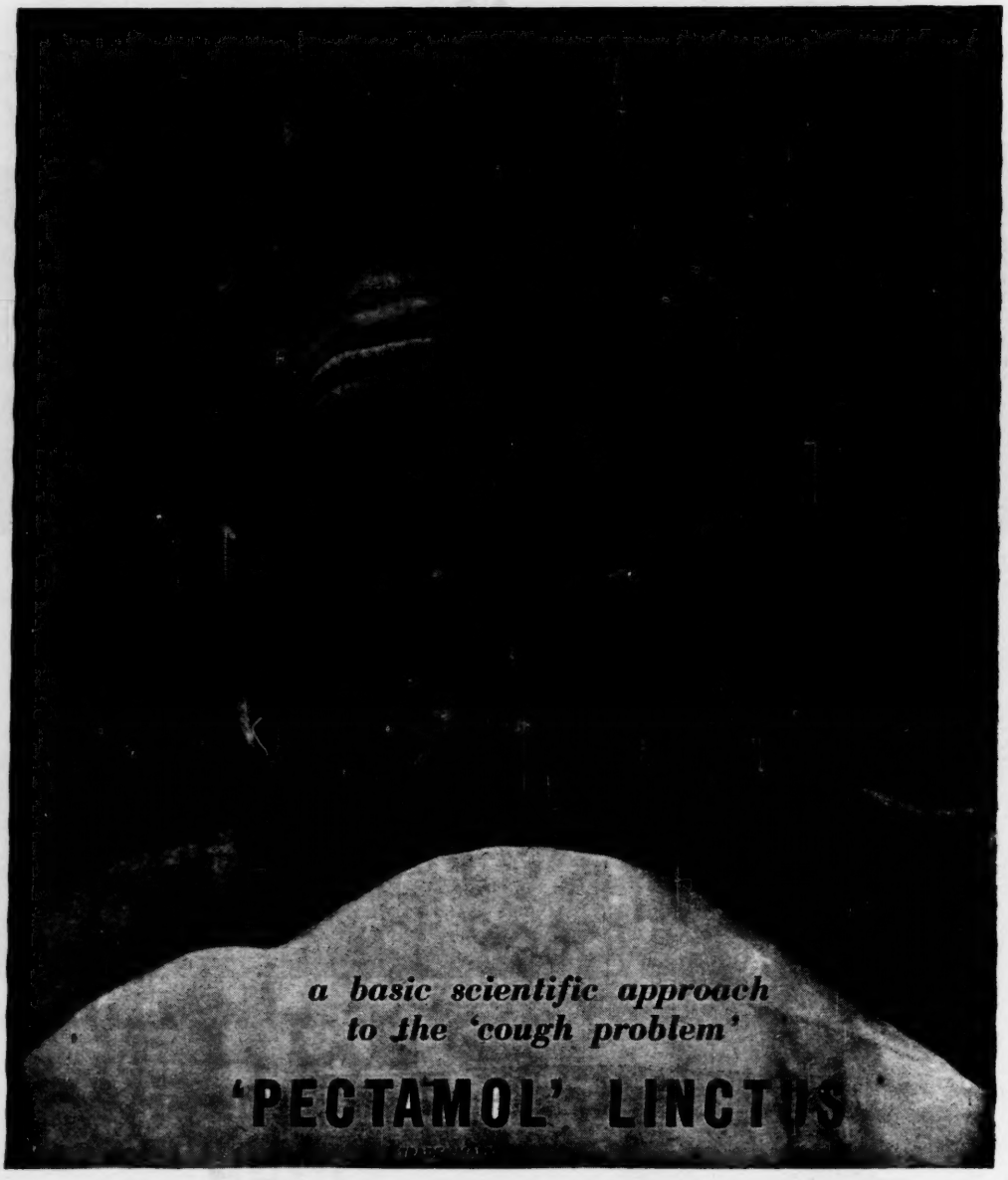
CODEINE

and you prescribe **relief** from **cough** and **congestion**

G.P. PTY. LTD.

DOSAGE: *Adults — One tablespoonful when the cough is troublesome. Children — Up to 2 teaspoonsful (according to age) when the cough is troublesome.* • *Bottles of 8 fl. ozs.*

MITCHELL ROAD, ALEXANDRIA, N.S.W., AUSTRALIA



PECTAMOL contains a new type of cough suppressant discovered in the B.D.H. Research Laboratories.

Its active constituent is the citrate of the diethylaminoethoxyethyl ester of x: x-diethylphenylacetic acid (oxeladin). Each teaspoonful (3·55 ml.) of Pectamol contains 10 mg.

PECTAMOL has a selective action on the medullary centre controlling the cough reflex.

PECTAMOL suppresses irritating, dry, unproductive cough. Is palatable and well tolerated. Is non-toxic — it is free from soporific, nauseating and constipating effects. Is non-habit-forming. Is not related to opium alkaloids or their derivatives.

DOSAGE: Adults, 1 or 2 teaspoonfuls four times daily. Children, ½ to 1 teaspoonful four times daily.

AVAILABILITY: Bottle of 60 ml., bottle of 250 ml., bottle of 2 litres.

Literature and specimen package available on request

THE BRITISH DRUG HOUSES (AUSTRALIA, PTY.) LTD.

250 PITT STREET, SYDNEY.

BDH49/FP.

A NEW BRIGHT SPOT IN ANTIBACTERIAL THERAPY

'Madribon'
Trade Mark Roche

Antibacterial

N.H.S. ITEM

MADRIBON is a completely new, safer antibacterial of particular value in upper respiratory, urinary tract and other bacterial infections. Though used in low doses—one or two tablets daily—a single dose is adequate for 24 hours. Because of its wide spectrum, high clinical effectiveness, exceptionally low incidence of side effects and unique mode of excretion, Madribon represents a genuine advance in the treatment of bacterial infections. Chemically, Madribon is 2,4-dimethoxy-6-sulfanilamido-1,3-diazine.

PACKINGS: Tablets 0.5 G. in packings of 12 and 250.

N.H.S. ITEM No. 787

ROCHE PRODUCTS PTY. LIMITED 1 BARRACK STREET, SYDNEY.

In the treatment

of the aged

Fortagen

BROAD SPECTRUM

Vitamin Food Supplement

"The elderly require a good mixed diet, but tend to believe that a simple meal of bread, margarine and tea is enough for them. Severe malnutrition can result from such behaviour, and every effort should be made to ensure that a varied diet is eaten."

(Extract by Lord Amulree, M.D., F.R.C.P., The Practitioner, July, 1956.)

Sometimes this advice is easier to give than, in practice, to follow, and a dietary supplement becomes essential in such cases, if health is to be maintained. FORTAGEN, a combination of malt, milk and eggs fortified with eight essential vitamins, then becomes the product of choice. Easy to assimilate and pleasant to taste, FORTAGEN taken daily will provide a full nutritional complement, which greatly increases resistance to disease.

Each ten grams contains not less than:	
Vitamin A .. 3,000 i.u.	Vitamin B_{12} .. 2 mcg.
Vitamin B_1 ... 0.9 mg.	Vitamin C .... 30 mg.
Vitamin B_2 ... 1.8 mg.	Vitamin D .... 400 i.u.
Vitamin B_6 ... 1.5 mg.	Niacin ..... 12 mg.

with MALT, MILK, EGGS and cereal all correctly balanced to procure restoration and/or maintenance of normal cellular functions.

IN PAEDIATRICS

AS A DIETARY SUPPLEMENT

FOR CONVALESCENTS

FOR NURSING MOTHERS

Literature on the above subjects will be mailed regularly and on request.

ADMINISTRATION. Taken with either hot or cold milk, or sprinkled on breakfast foods, ice-cream or desserts.

WANDER

Berne, Switzerland; London, England; Chicago, U.S.A.; Devonport, Tasmania.

WF3d.60

CSL

INFLUENZA VIRUS VACCINE

(Polyvalent)

FOR BEST PROTECTION

C.S.L. Influenza Virus Vaccine (Polyvalent), with its high content of type A/Asia and type B antigens, is still the best protection against the present dominant strains of influenza virus . . . in addition it affords a sound basic immunity against the less common types.

The recommended dosage is now —

ADULTS:

If previously immunized 1 subcutaneous injection of 1 ml. If not previously immunized 2 subcutaneous injections of 1 ml. at 3 to 4 weekly intervals.

CHILDREN:

Previously immunized (6 to 10 years) 1 subcutaneous injection of 0.5 ml. For children not previously immunized, 2 subcutaneous injections of 0.5 ml. at 3 to 4 weekly intervals.

It is not recommended for children under 6 years of age, but, if required, should be given by intradermal route in doses of 0.025 ml. to 0.1 ml., according to age.

Available in rubber-capped bottles of 1.0 ml., 6.0 ml. and 20.0 ml.

Information and advice on the use of C.S.L. products is always available through —

COMMONWEALTH SERUM LABORATORIES

Parkville, N.2, Victoria

Shorten the course of Pertussis . . .

TRADE MARK

EUMYDRIN

BRAND OF ATROPINE METHONITRATE

Widely accepted as the
STANDARD SYMPTOMATIC TREATMENT
for WHOOPING COUGH

Treatment with Eumydrin Drops is commenced as early as possible, the dosage depending upon the age of the child and the severity of the attack. Infants up to 6 months receive two to four drops every four hours; those from 7 months to 2 years three to six drops; children 3 to 6 years four to eight drops; 7 to 10 years six to twelve drops.

EUMYDRIN DROPS
Bottles of 15 c.c. with dropper
A PHARMACEUTICAL BENEFIT
(N.H.S.)

Trade BAYER Mark

BAYER PHARMA PTY. LTD.
SYDNEY

Distributors: WINTHROP LABORATORIES
Sydney - Melbourne - Brisbane - Adelaide - Perth

8469

today . . . more than ever before . . . the proved therapy for ordinary constipation

Nujol

★ NON-FATTENING
★ COMPLETELY ODOURLESS
★ TASTELESS
★ ABSOLUTELY PURE
★ CRYSTAL CLEAR

ADMINISTRATION:

1 to 2 tablespoonfuls. Child 12 years: 1 to 2 teaspoonfuls. Child 6 years: 1 teaspoonful.

PRESENTATION:

"Nujol" now comes to you in amber bottles in order to protect it from the effects of sunlight or fluorescent light.

Nujol

For the relief of ordinary CONSTIPATION

Made in Australia for

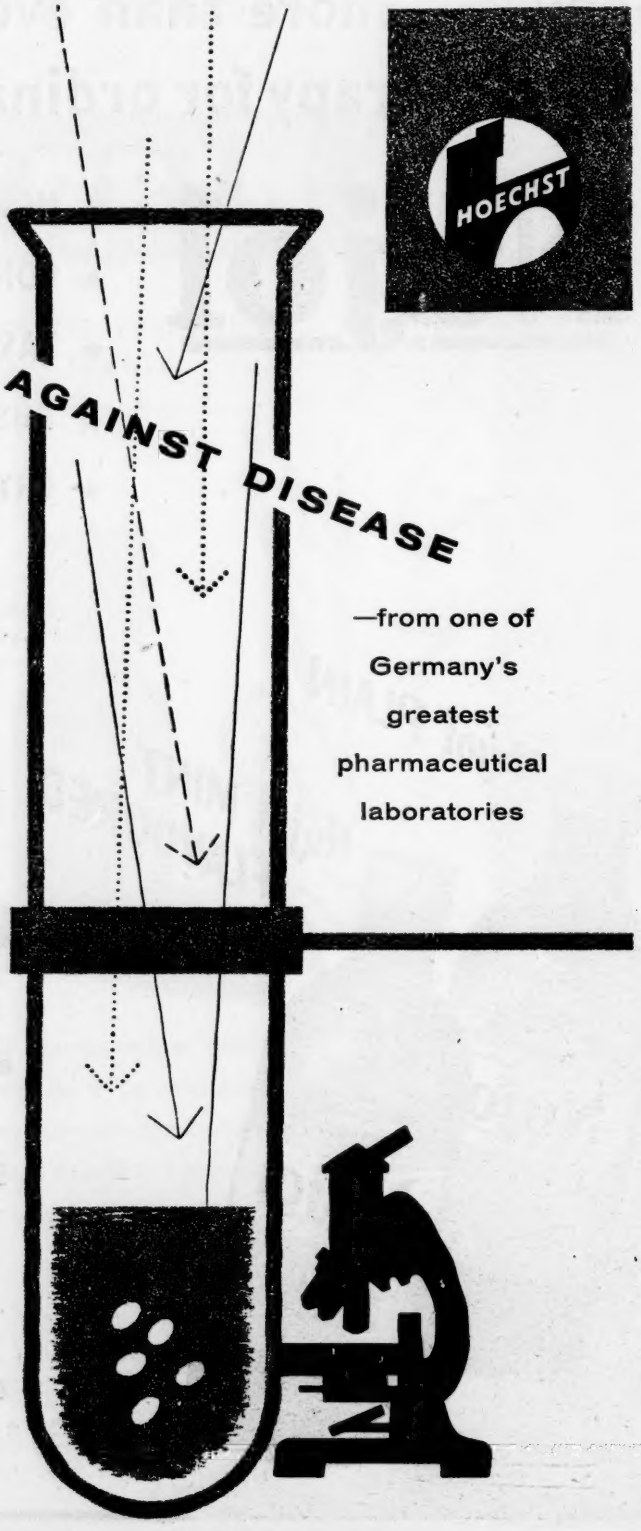
POTTER & BIRKS PTY. LTD.

Sole Registered Users with consent of Plough, Inc. U.S.A.

PB23/FP.

NEW WEAPONS AGAINST DISEASE

—from one of Germany's greatest pharmaceutical laboratories

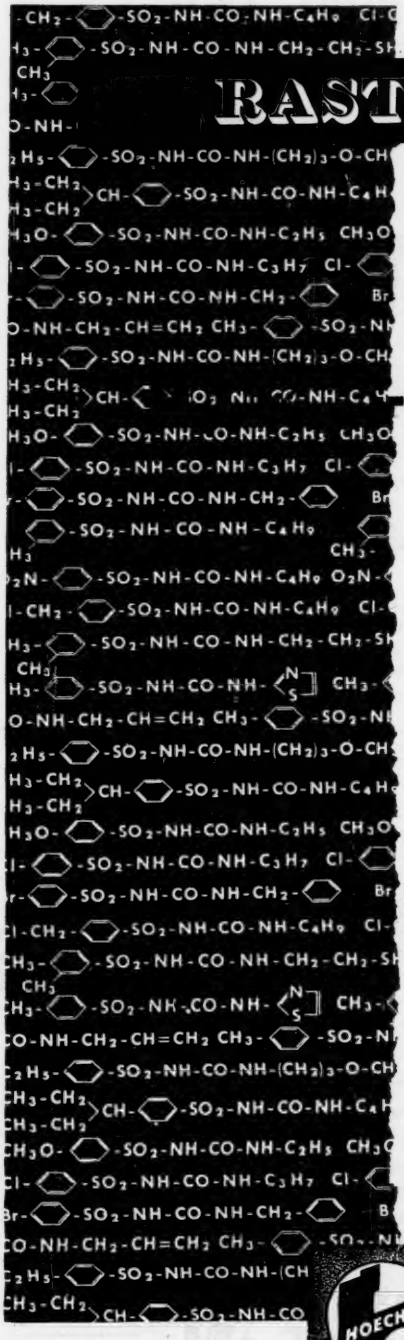


THE RESEARCH LABORATORY is the very centre of a great pharmaceutical company. Without it no discoveries could be made, no progress would be possible—it is the hub of all activity. For this is where ideas are conceived, experiments carried out, and results evaluated—in the hope that something will come to light to advance the frontier of medical knowledge another step.

300 graduate scientists—chemists, doctors, pharmacists—are employed by Hoechst in Frankfurt on pharmaceutical research alone. They work in ultra-modern laboratories, with all the equipment they could possibly need—inspired by the example of such illustrious predecessors at Hoechst as Emil von Behring and Paul Ehrlich, originators respectively of the first diphtheria antitoxin and Salvarsan.

Hoechst standards, not only in research but also in production, are second to none in the world.

HOECHST



One synthetic hypoglycaemic substance was chosen from over a thousand...

$-SO_2-NH-CO-NH-C_4H_9$

because it combined high therapeutic effectiveness with absolute safety

MORE THAN A THOUSAND hypoglycaemic substances have been synthesized. But in Rastinon (tolbutamide), Farbwerke Hoechst A.G. offer an anti-diabetic agent which has proved, after comprehensive laboratory and clinical tests, to combine *high therapeutic effectiveness* with *absolute safety*.

The primary consideration which led to the selection of Rastinon by Hoechst was its safety. Rastinon is better tolerated than any other oral anti-diabetic agent.

This factor, together with its reliable hypoglycaemic action, determines its optimal pharmacological properties.

Here then is a new era in the therapy of diabetes—already proved for over 1,250,000 diabetics all over the world.

SUBJECTIVE ADVANTAGES:

Rastinon, the standard *oral* anti-diabetic agent, eliminates all problems of self-administration associated with injections. In many cases one tablet by mouth once or twice a day is all that is necessary for maintenance. In diabetic patients with tremor, physical disability, or psychic problems, the advantages of Rastinon's oral control may be especially relevant.

OBJECTIVE ADVANTAGES:

There is virtually no danger of hypoglycaemic reactions as a result of Rastinon therapy, regardless of dosage. Rastinon is a true euglycaemic agent. In patients in whom maintenance dosage has been established, it lowers the blood sugar *to* normal levels, but almost never *beyond* that point.

The Rastinon combination of *high therapeutic effectiveness, absolute safety* and *low cost* cannot be matched by any other oral anti-diabetic agent.

Manufactured for **FARBWERKE HOECHST AG.**
FRANKFURT (M) . HOECHST, GERMANY

By the Sole Australian Distributors **FAWNS & McALLAN PTY. LTD.**
CROYDON, VICTORIA, AUSTRALIA

FOR THROAT AND MOUTH INFECTIONS . . .

TYROTHRICIN

for antibiosis against Gram-positive bacteria.

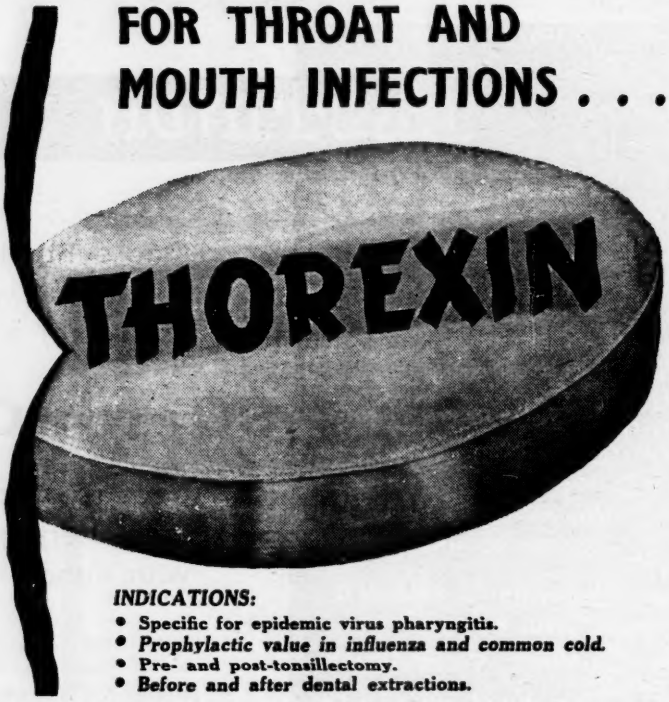
ETHYL AMINOBENZOATE

for prolonged acting local anæsthesia to accelerate healing processes.

CHLOROPHYLL

for healing damaged tissue and counteracting malodour.

"THOREXIN" Antibiotic - Anæsthetic Throat Tablets contain a balanced formula of tyrothricin, ethyl aminobenzoate and chlorophyll, specially compounded for the treatment and alleviation of mouth and throat infections and irritations.



INDICATIONS:

- Specific for epidemic virus pharyngitis.
- *Prophylactic value in influenza and common cold.*
- Pre- and post-tonsillectomy.
- Before and after dental extractions.

Clinical samples available for testing on application to the manufacturers.

'ULOSAN'

for the relief of DYSPEPTIC, DENTAL *and* NON-SPECIFIC ORAL ULCERS

ANÆSTHESIA is provided by *Procaine* and *Ethylaminobenzoate*, noted for their prolonged action, comparative insolubility and low toxicity.

ANTIBIOSIS is effected with *Tyrothricin*, chosen for its powerful local action against gram-positive organisms and for its blandness on mucous membranes.

ANTISEPSIS is achieved by *Propylene Glycol* for its action on the gram-negative group of organisms. It also facilitates penetration of the active principles by reason of its detergent nature.

PROTECTIVE COAGULUM is furnished by the use of *Gentian Violet*.

Supplied in a conveniently sized bottle with applicator rod.
Clinical samples readily available on application to the manufacturer.

Manufactured by
GROSVENOR LABORATORIES PTY. LTD.
Sydney

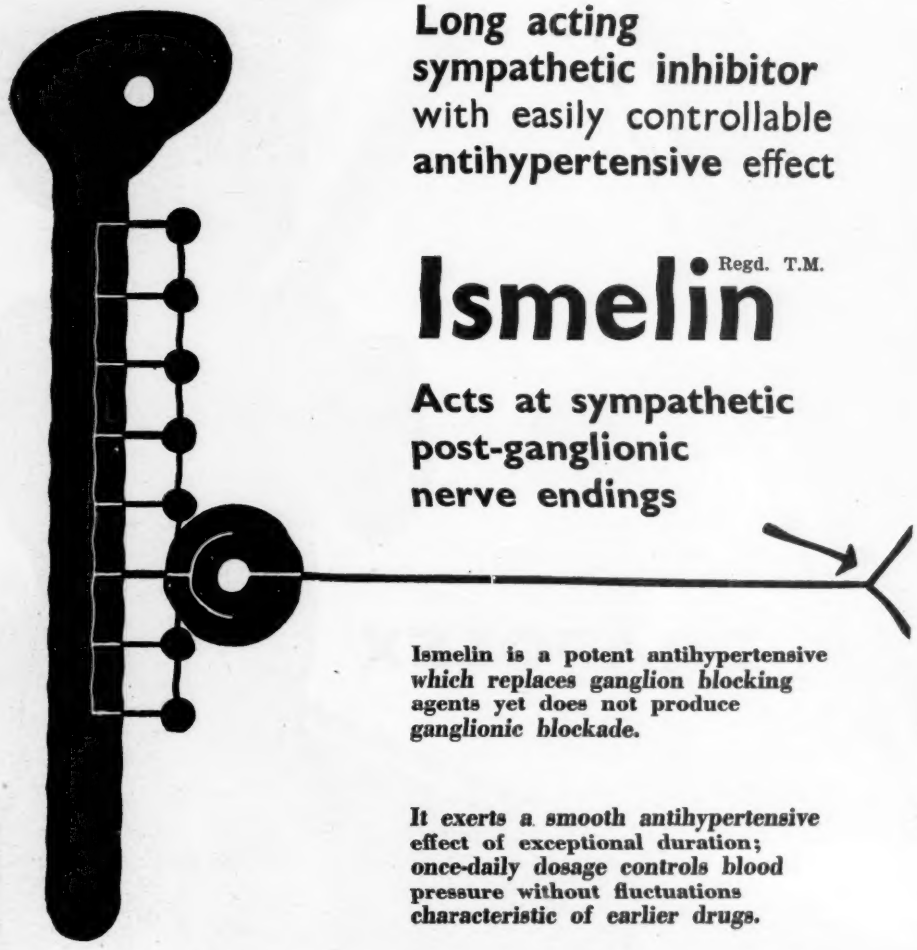
Distributed by
POTTER AND BIRKS PTY. LTD.
Sydney

New

Long acting
sympathetic inhibitor
with easily controllable
antihypertensive effect

Ismelin® Regd. T.M.

Acts at sympathetic post-ganglionic nerve endings



Ismelin is a potent antihypertensive *which replaces ganglion blocking* agents yet does not produce *ganglionic blockade.*

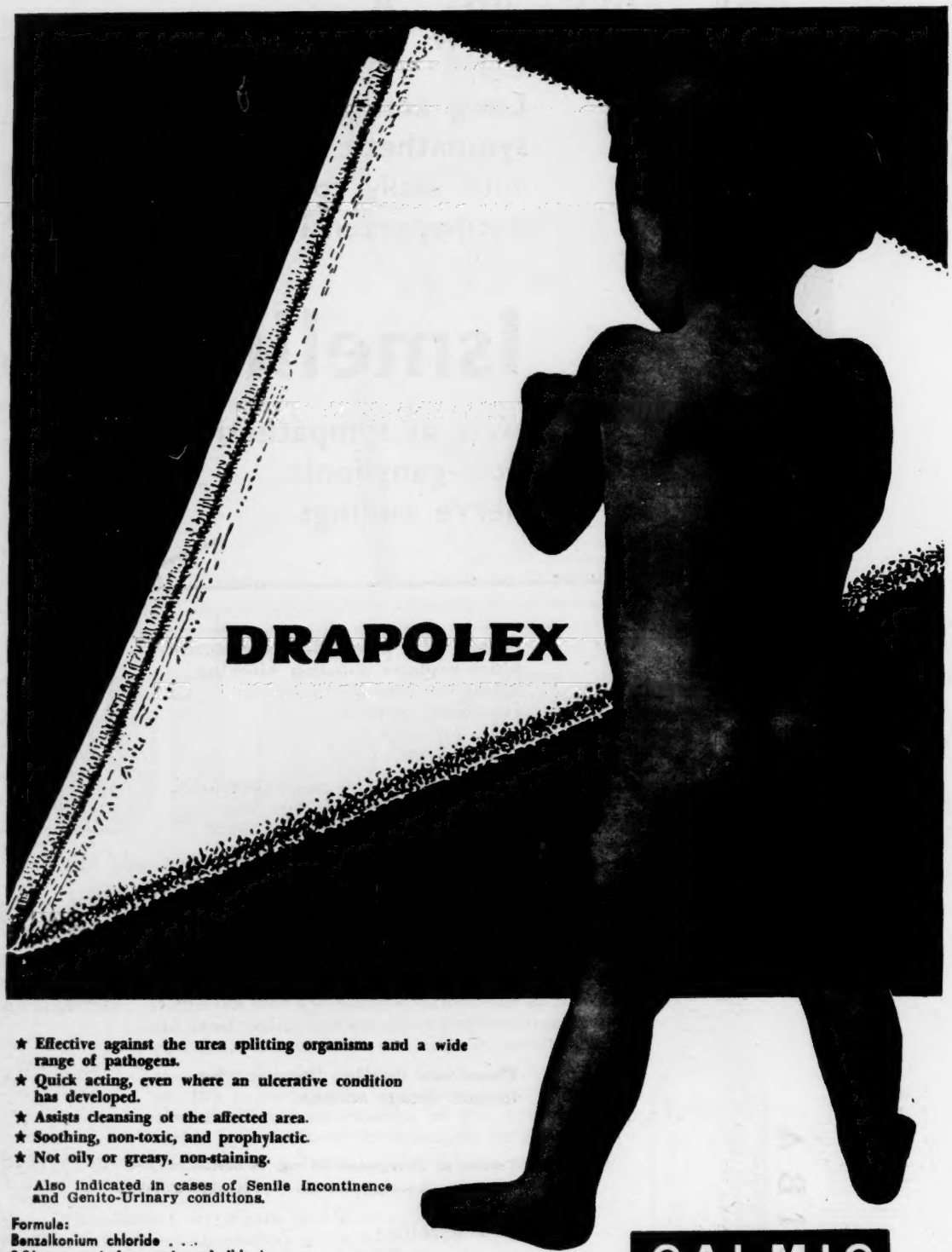
It exerts a *smooth antihypertensive* effect of exceptional duration; *once-daily dosage controls blood* pressure without fluctuations *characteristic of earlier drugs.*

Ismelin does not affect the *parasympathetic system*; constipation, paralytic *ileus and dry mouth do not occur.*

***Please see detailed literature for* unique dosage scheme.**

Tablets of 10 mg. and 25 mg. in bottles of 100.
Ismelin is 2-perhydroazocin-1′-yl-ethylguanidinium sulphate.
(Guanethidine)
a product of CIBA research

CIBA



★ Effective against the urea splitting organisms and a wide range of pathogens.
★ Quick acting, even where an ulcerative condition has developed.
★ Assists cleansing of the affected area.
★ Soothing, non-toxic, and prophylactic.
★ Not oily or greasy, non-staining.

Also indicated in cases of Senile Incontinence and Genito-Urinary conditions.

Formula:
Benzalkonium chloride . . .
0.01 per cent. in a water miscible base.

Presentation:
2 oz. tubes.

CALMIC
purely British Pharmaceuticals

CALMIC LIMITED, Crewe, Cheshire. Australian Branch: Bibby Street, Chiswick, Sydney, N.S.W. 'Phone WF 6178.

MA6202/80

an attack of migraine has been averted...

'Stemetil' PROCHLORPERAZINE

trade mark brand

for the prevention and management of true migraine

Detailed information is available on request

'Stemetil' is supplied as

5 mg. and 25 mg. tablets

5 mg. and 25 mg. suppositories

1·25% solution for injection

MANUFACTURED BY MAY & BAKER LTD

An M&B brand Medical Produc

DISTRIBUTORS: MAY & BAKER (AUSTRALIA) PTY. LTD. ● P.O. BOX 41 ● FOOTSCRAY W.11 VICTORIA ● TEL.: MM 9131 10-14 YOUNG STREET ● SYDNEY ● TEL.: BU 3621

the clock strikes 2...

...and your ulcer patient sleeps undisturbed

Daricon is a new anticholinergic characterized by long duration of effect. With an action of 9-10 hours Daricon gives adequate control of the ulcer patient during the important over-night sleeping period.

"In this study of insulin-stimulated secretion, oxyphencyclimine administered ten hours previously was shown to have an inhibitory effect on acid and pepsin equivalent to 30 mg. of propantheline given three hours previously." †

† D. W. Piper et al., M.J.A., Feb. 13, 1960.

DARICON *

OXYPHENCYCLIMINE HYDROCHLORIDE

Package Information
DARICON
Tablets, 10 mg., 60's — white, scored tablets

Pfizer

PFIZER CORPORATION, BOX 57, P.O., WEST RYDE, N.S.W.

* trademark of Chas. Pfizer & Co. Inc.

AUS: 2226

forestall the epileptic personality

Fear of seizures, parental attitudes and social rejection all threaten the epileptic child. Brain damage or the abnormal discharge itself may provoke psychic disorders.

Better control of seizures and better understanding by parents *before* a child starts school may prevent the development of an epileptic personality.

Highly effective: In most types of seizures, especially major motor seizures, **PROMINAL** is one of the safest anti-convulsants for children. This anti-epileptic does not tend to lower learning capacity.

Unsurpassed safety: Prominal is not likely to cause hyperactivity in young children. Toxic reactions or ill effects from it are rare.

PROMINAL COMPOUND, combining Prominal and diphenylhydantoin, is synergistic and side effects are infrequent. Each relatively tasteless Prominal Compound tablet contains 90 mg. Prominal and 60 mg. diphenylhydantoin. Prominal Compound brings maximal control of seizures with minimal toxicity.

Prominal dosage: CHILDREN under 5 years, from ¼ to ½ grain three or four times daily; over 5 years, from ½ to 1 grain three or four times daily. ADULTS, from 6 to 9 grains daily.

Prominal Compound dosage: CHILDREN under 6 years; ½ tablet once or twice daily; over 6 years, 1 tablet two or three times daily. ADULTS, 1 or 2 tablets three times daily (average dosage).

For epilepsy at any age

PROMINAL

brand of phemitone

AVAILABLE FREE UNDER N.H.S.

Supplied: **PROMINAL** tasteless tablets of 200 mg. (3 grains), 65 mg. (1 grain), 32 mg. (½ grain). Bottles of 100.

PROMINAL COMPOUND virtually tasteless tablets. Bottles of 100.

BAYER TRADE MARK

BAYER PHARMA PTY. LIMITED • 75-89 ATKINS ROAD, ERMINGTON, N.S.W.
Distributors—WINTHROP LABORATORIES • Sydney, Melbourne, Brisbane, Adelaide, Perth.

2.10.59

SIGMA NEOMYCIN FORMULATIONS

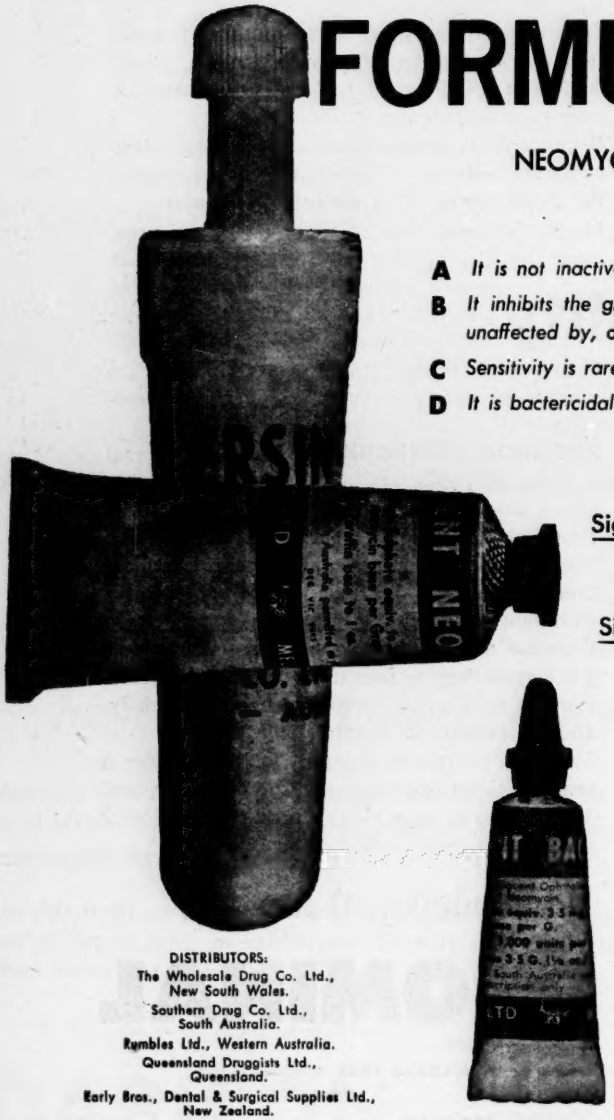
NEOMYCIN IS THE TOPICAL ANTIBIOTIC OF CHOICE

A *It is not inactivated by pus, enzymes or tissue exudates.*

B *It inhibits the growth of many micro-organisms resistant to, or unaffected by, other antibiotics.*

C *Sensitivity is rarely, if ever, produced.*

D *It is bactericidal and not merely bacteriostatic.*



THREE SIGMA NEOMYCIN FORMULATIONS ARE AVAILABLE

Siguent Neomycin: For pyogenic infections of the skin.

Spersin: For burns and first aid.

Siguent Bacomycin: For ophthalmic use.

SIGUENT NEOMYCIN

FORMULA:
Neomycin (Base) 3.5 mg.
Paraffin Ointment Base to 1 G.
PACK: 1 oz.
SHELF LIFE — TWO YEARS

SPERSIN

FORMULA:
Neomycin (Base) 10 mg.
Sterile Lactose to 1 G.
PACK: 7.1 G.
SHELF LIFE — TWO YEARS

SIGUENT BACOMYCIN

FORMULA:
Neomycin (Base) 3.5 mg.
Bacitracin 1000 U.
Oculentum Base to 1 G.
PACK: 1 dram
SHELF LIFE — 18 MONTHS

DISTRIBUTORS:
The Wholesale Drug Co. Ltd., New South Wales.
Southern Drug Co. Ltd., South Australia.
Rumbles Ltd., Western Australia.
Queensland Druggists Ltd., Queensland.
Early Bros., Dental & Surgical Supplies Ltd., New Zealand.

SIGMA

SIGMA COMPANY LIMITED

Makers of fine pharmaceutical products

589 COLLINS STREET, MELBOURNE, C.1

N-1-59

When respiratory infections
are at their peak remember

'S-MEZ'
Trade Mark

'S-MEZ' is short for 'SULPHAMEZATHINE' Sulphadimidine B.P.

provides an effective first line of attack

It is particularly useful against pneumonias and upper respiratory infections, and can be relied upon to deal adequately with the secondary bacterial infections associated with influenza and the common cold.

Available under the National Health (Pharmaceutical Benefits) Regulations.

Marketed in Australia by
IMPERIAL CHEMICAL INDUSTRIES OF AUSTRALIA & NEW ZEALAND LTD.
A product of Imperial Chemical Industries Ltd. Pharmaceuticals Division, England

2959 MED.187X.971

The two-purpose cream!

DERMABASE

DERMABASE-R
(higher oil content)

DERMABASE-S
(silicone containing)

For skin protection — For an Ointment base

Sample and literature on request

HAMILTON LABORATORIES Ltd.
ADELAIDE

WHEN
A MAN IS A
WHIRLWIND . . .
CALM THE
EMOTIONAL
STORM

Pacatal . . .

- "normalises" thinking and emotional responses
- calms without "flattening", keeps patients alert
- elevates the mood instead of *sedating the patient*

Available: Tablets — 25 mg. in bottles of 100 and 500; Ampoules — 2 c.c. (25 mg./c.c.) in boxes of 6 and 100.

pacatal

FOR NORMALISATION
— NOT SEDATION

WILLIAM R. WARNER & CO. PTY. LTD.
508-528 RILEY STREET • SYDNEY, N.S.W.

Patients who cannot take ordinary analgesics

because of... **INTOLERANCE**

CONSTIPATION

ALLERGIC REACTION

STOMACH BLEEDING

can now obtain ***SAFE, QUICK*** and ***PROLONGED RELIEF***

from all ***MILD PAIN WITHOUT*** fear of ***IRRITATION***

PANADOL

Proved in Britain — Now Available in Australia

Panadol, N-acetyl-p-aminophenol, is the active metabolite of *phenacetin, a synthetic compound with pronounced analgesic and* antipyretic properties. Because Panadol's effective action is achieved *without aspirin, phenacetin* or codeine, it does not produce side-*effects that often accompany these other comparable analgesics.*

Thus PANADOL is particularly useful in such cases as

ASTHMA—*where aspirin causes an allergic reaction in* about ten per cent. of cases.

PEPTIC ULCER—*where aspirin exacerbates symptoms and may* precipitate bleeding.

PATIENTS WITH A HISTORY OF ALLERGY—*these patients are more likely to be sensitive* to aspirin.

CONSTIPATED PATIENTS—*where codeine-containing* preparations make the condition worse—particularly if the patient *is bed-ridden.*

In these cases, where other analgesics could mean risk to the patient, Panadol may safely be given as a routine analgesic and antipyretic. It is far less likely to cause allergic reactions, gastric irritation, or constipation.

PANADOL 0.5 G. tablets are available in vials of 20 and 100. Panadol is not a scheduled poison.

WINTHROP LABORATORIES • *Division of Sterling Pharmaceuticals Pty. Limited*

7A.57

IN OFFICE SURGERY

ELECTIVE AND TRAUMATIC

use **XYLOCAINE** *first . . .*

as a local Anaesthetic

or a topical Anaesthetic

SWAB SPRAY

INFILTRATION NERVE BLOCK

Xylocaine is the most versatile anaesthetic for general office surgery, relieves pain promptly and effectively with adequate duration of anaesthesia. It is safe and predictable. Local tissue reactions and systemic side effects are rare.

SUPPLY:

Injectable Solutions

2 c.c. Ampoules	2% Xylocaine Plain and 2% Xylocaine with Epinephrine
20 c.c. and 50 c.c. Vials	0.5%, 1% and 2% Xylocaine Plain or with Epinephrine

Topical

Xylocaine Ointment	10g., 35g. tubes and 100g. jars
Xylocaine Jelly	35 ml. tubes with applicator and key
Xylocaine Viscous	100 ml. bottles
Xylocaine 4% Topical Solution	30 ml. bottles

XYLOCAINE

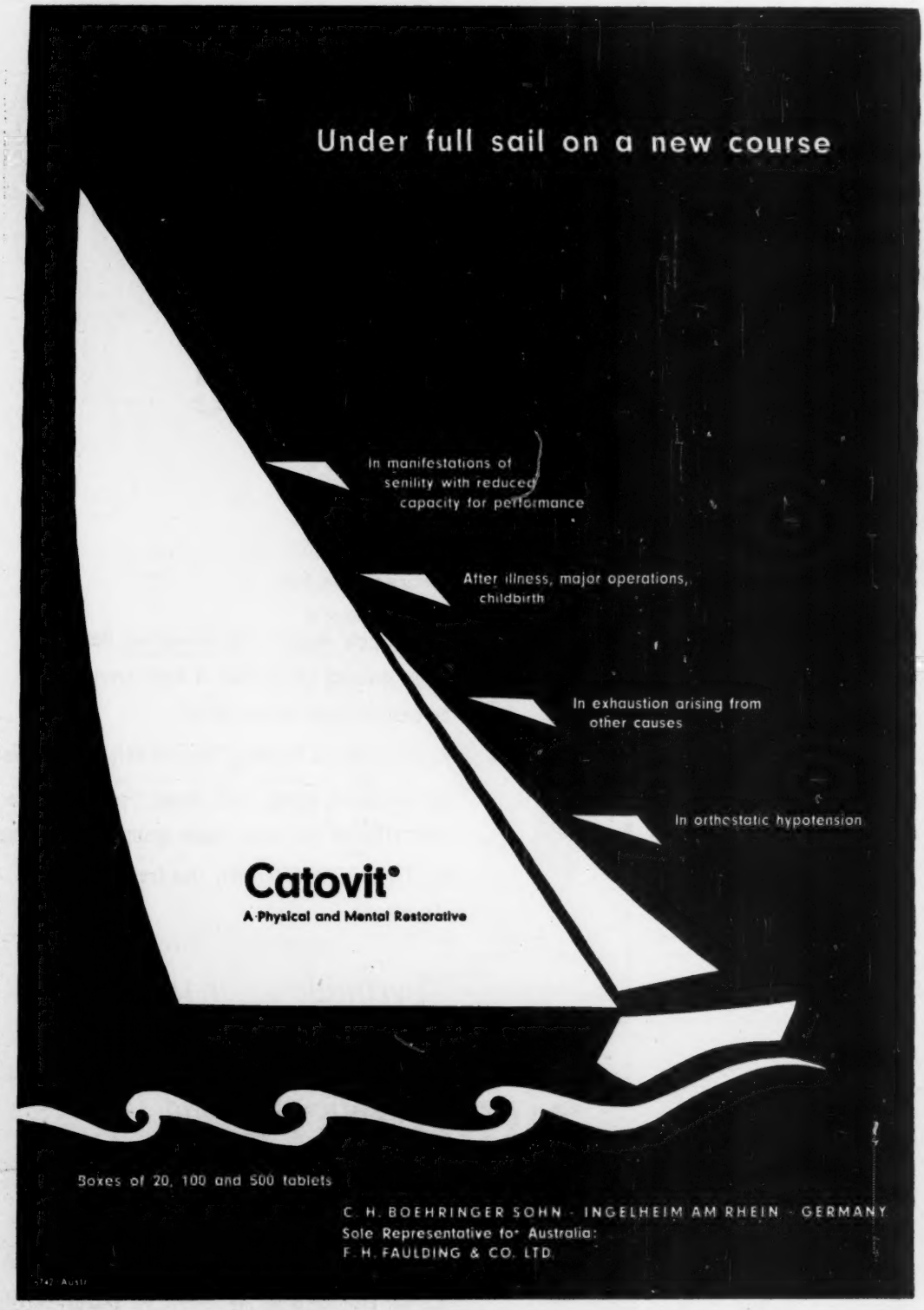
THE ORIGINAL LIGNOCAINE

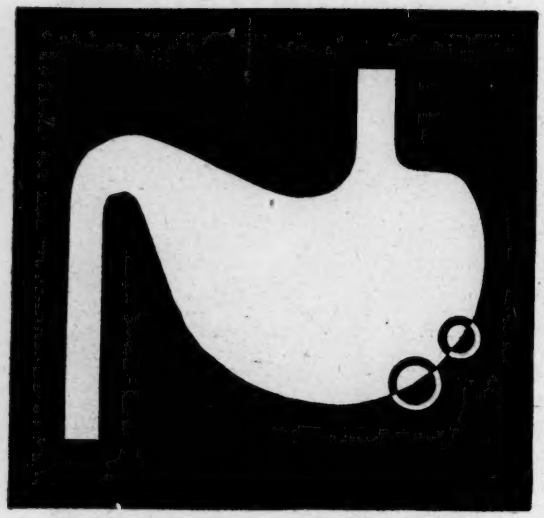
ASTRA

ASTRA PHARMACEUTICALS (AUSTRALIA) PTY. LTD.
BRISBANE

Distributed by COMMONWEALTH DENTAL SUPPLY CO., Brisbane

AP/P1.


Under full sail on a new course
In manifestations of senility with reduced capacity for performance
After illness, major operations, childbirth
In exhaustion arising from other causes
In orthostatic hypotension
Catovit®
A Physical and Mental Restorative
Boxes of 20, 100 and 500 tablets
C. H. BOEHRINGER SOHN · INGELHEIM AM RHEIN · GERMANY
Sole Representative for Australia:
F. H. FAULDING & CO. LTD.



new
long-acting
anticholinergic

Tyrimide

ISOPROPAMIDE IODIDE

Experimental studies and clinical use have established that:

1. 'Tyrimide' is inherently long-acting. One dose in the morning and another at night provide an uninterrupted 24-hour effect

2. 'Tyrimide' is effective. Tests of anti-secretory and anti-spasmodic activity have proved 'Tyrimide' to be more effective than other newer synthetics and atropine

3. 'Tyrimide' is remarkably free from troublesome side-effects

'Tyrimide'—for the anticholinergic management of peptic ulcer and gastro-intestinal disorders

EACH 'TYRIMIDE' TABLET CONTAINS 5 MG. ISOPROPAMIDE IODIDE

Smith Kline & French Laboratories (Australia) Ltd,
(Incorporated in England)
Corner Denison & Spring Streets, N. Sydney, NSW

TM:PA99A 'Tyrimide' is a trade mark Aust. Pat. No. 208195

running noses

and open blocked noses orally

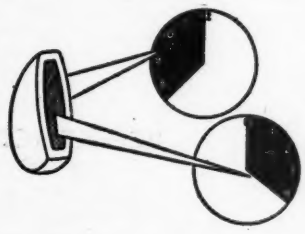
with TRIOMINIC . . .
an Oral Nasal Decongestant

- **in nasal and paranasal congestion**
- **in sinusitis**
- **in postnasal drip**
- **in allergic reactions of the upper respiratory tract**

the advantages of effective oral medication

- **reaches all respiratory membranes systemically**
- **avoids "nose drop addiction"**
- **not likely to cause rebound congestion**
- **provides long-lasting relief**

Relief with Triominic is prompt and prolonged because of this special timed-release action . . . beneficial effect starts in minutes, lasts for hours.



FIRST the outer layer dissolves within minutes to produce 3 to 4 hours' relief.

THEN the inner core disintegrates to give 3 to 4 more hours' relief.

THUS 3 tablets daily "unblock around the clock".

Each "timed-release" TRIOMINIC Tablet contains:

Phenylpropanolamine-HCl . . 50 mg.
Mepyramine maleate B.P. . . . 25 mg.
Pheniramine maleate . . . . . 25 mg.

Dosage: 1 tablet in the morning, afternoon and in the evening if needed. An average prescription is 12 tablets.

Packs: Supplied for dispensing in bottles of 12, 50 and 250.

Also Available: "Triominic" Syrup, for children and those adults who prefer a liquid medication, in bottles of 2 fl. oz. and 20 fl. oz.

'Triominic'

WANDER

THE *NEW* CONCEPT FOR RELIEF OF THE COMMON COLD

A WANDER PRODUCT. ***Sole Australian Distributors:*** **PHARMEDICA PTY. LTD., Kingsgrove, N.S.W.**

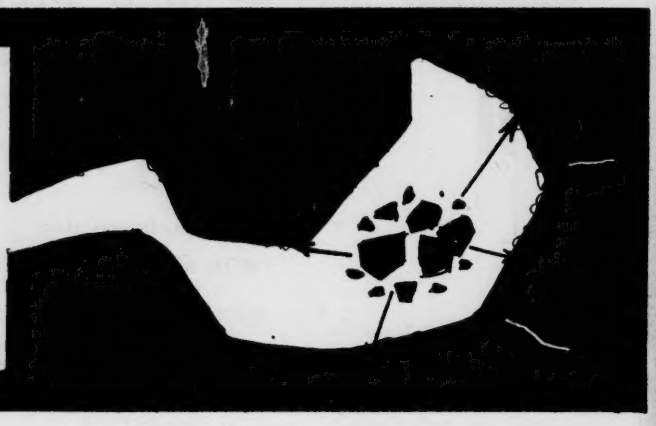
PH64/FP.

A SELECTIVE TREATMENT

with an absence of side effects

SECERGAN

Acts directly on neural plexuses of the gastro-intestinal wall



1. Secergan accumulates mainly in gastric mucosa, intestinal mucosa and pancreas, but not in salivary glands. Its action is on the neural plexuses of the gastro-intestinal tract[1]. Secergan is not a ganglion blocking agent.

2. Secergan produces rapid relaxation of the stomach, duodenum, choledochus, and even the sphincter of oddi. Reduces the volume of gastric secretion by 45% and the acidity by 75%[2-4].

3. Secergan has not been observed in the systemic circulation, C.N.S. or musculature[3]

4. An average of 95% unchanged Secergan is recovered after oral administration; 90% in faeces, 5% in urine[1].

5. The extremely low absorption explains the absence of side effects, and unusually large oral dose — 150 mgm. tablet.

Oral treatment gives quick relief, and extended benefit to the patient is obtained through localised action. There are no side effects such as dryness of the mouth or pharynx, eye symptoms or constipation.

"The difference between the effect and side reactions of SECERGAN and those of other anti-cholinergic drugs is most likely due to the local effect of SECERGAN on neural plexuses in the gastric and intestinal wall. The existence of this local accumulation in the gastric mucosa and other organs, if being of importance for the mechanism of action, means that the quantity absorbed is not decisive for the effect." — TOMENIUS, J.

REFERENCES:

1. **TOMENIUS, J.: SV. LAKARTION *56*, 3100 1959.**
2. **EDHOLM, P.: ACTA RADIOLOGICA FEB. 1960.**
3. **ALLGEN, L. G., EKMAN, L., REID, L., AND ULLBERG, S.: UNDER PUBLICATION.**
4. **TOMENIUS, J.: ACTA MED. SCAND. *157*, 11, 1957.**

ORALLY:

Secergan is available as sugar-coated tablets of 150 mg. in bottles of 100.

PARENTERALLY:

2 cc. Ampoules containing 20 mg. of prepared solution for intramuscular injection. 10 to 20 mg. per injection. Boxes of 10 ampoules.

Literature and samples on request to

ASTRA

for the removal of wax from ears without syringing under pressure

CERUMOL EAR DROPS

* Regd. TRADE MARK

An oily preparation with anti-bacterial action, for softening, disimpacting and dissolving wax in the external auditory meatus.

Cerumol is safe, efficient, anti-bacterial and saves time and trouble.

Packs: For Surgery Use—10 c.c. vial (separate dropper included). For Hospital Use—2 oz.

ACTIVE CONSTITUENTS per 100 c.c.

p-dichlorobenzene B.P.C.	2 gm.
Benzocaine B.P.	2 gm.
Chlorbutol B.P.	5 gm.
Ol. Terebinth B.P.	15 c.c.

CONTRA-INDICATIONS:

Otitis externa, Seborrhœic dermatitis and eczema affecting the external ear.

Manufactured by: LABORATORIES FOR APPLIED BIOLOGY LTD., LONDON

Australian Distributors: **SALMOND & SPRAGGON (AUSTRALIA) PTY. LTD.**

BOX 111, P.O., NORTH SYDNEY, N.S.W. Also at: MELBOURNE, BRISBANE, ADELAIDE, PERTH.

SC.4.FP.

PRACTICES

SOLO PRACTICE wanted on Sydney North Coast for transfer December, 1961. Combined residence and surgery preferred. Residence must be for sale. Full details to Box No. 124 c.o. this office.

WESTERN SUBURBS (Sydney) lock-up surgery. G.C.T. £12,000. Two separate residences available if required. Goodwill £4500. Terms. Reply No. 86 c.o. this office.

HALF-SHARE available in growing practice in attractive Sydney suburb. Remaining partner has M.R.C.P. Modern suite. Good hours. Ring XU 2442.

GENERAL PRACTITIONER, 1949 Graduate, University of Sydney, 3 years' hospital experience and 7 years' general practice, desires solo or partnership practice in Sydney on the North Shore. Reply No. 119 c.o. this office.

WANTED TO LEASE at £50 a week, Sydney Western Suburbs practice; 1961. Would suit husband and wife team. G.T. £10,000. Reply No. 114 c.o. this office.

EASTERN SUBURBS (Sydney) lock-up premises available, no premium, fully equipped surgery and offices. Excellent prospect for capable practitioner to establish without cash outlay. Apply No. 125 c.o. this office.

PROTESTANT PARTNER, with surgical or obstetrical leanings, to join busy practice, N.S.W. North Coast town. Particulars in confidence. Reply Box 126 c.o. this office.

LEASE of practice and house, Western Suburbs, Sydney. Owner to be absent for 12 months. Write No. 134 c.o. this office.

M.R.A.C.P. desires to purchase practice or share of practice in Sydney southern suburb but other suburbs or a country area would be considered. Please ring FF 4387 or write No. 129 c.o. this office.

QUEENSLAND. MEDICAL AGENTS.

PRACTICES FOR SALE—
BRISBANE AND ENVIRONS.

1. Superior suburban locality with corresponding working conditions. G.T. exceed £6000 p.a. Goodwill £3000, terms by arrangement. Lock-up professional rooms 70/- per week. Residence is available for lease.

2. Excellent suburban practice. G.T. near £8000 p.a. Goodwill £3500. Family residence in spacious grounds at valuation £8000. Terms.

3. Outer suburb, sound centre, growing area. G.T. £7250. Goodwill £2500. Residence £5500, may lease. Overall deposit £2000.

4. Heart of city, and best shopping area. G.T. £5000 p.a. Could expand or maintain as 9 to 5 practice. Goodwill £1250.

5. On Account Deceased Estate. Outer suburbs. Lock-up practice. G.T. exceed £2000. Lease professional rooms 2 gns. per week. Goodwill £1000 or offer.

Partnerships, Assistantships, Locum Tenencies available.

Further details from:
BRITISH MEDICAL AGENCY OF QUEENSLAND PTY. LTD.,
B.M.A. House,
88 L'Estrange Terrace,
Kelvin Grove, W.1, Brisbane.

WANTED. Solo practice with residence, Sydney, Northern Suburbs. Cash. Reply No. 135 c.o. this office.

POSITIONS WANTED

HARD-WORKING thirty-four-year-old South African Doctor, with seven years' general practice experience in large partnership practice, seeks locum or assistantship up to three months duration, in Sydney on arrival in mid-November, 1960.

Furnished accommodation required for wife and two young children. Own car available. No surgery performed. Write No. 118 c.o. this office.

ASSISTANTSHIP WITH VIEW DESIRED.

Thirteen years' experience, hospitals and general practice. Married. Prefer vicinity of Sydney or Brisbane with accommodation.

Reply Box No. 141 c.o. this office.

LOCUM available during weekends and two nights a week, Sydney or Eastern Suburbs. One and a half years' experience in hospital. Reply No. 137 c.o. this office.

OPHTHALMOLOGIST returning shortly from the United Kingdom requires partnership or practice anywhere in Eastern States. Reply No. 139 c.o. this office.

LOCUM available for month of July anywhere in eastern half of Australia. Single. 2 years' teaching hospital experience. Reply No. 136 c.o. this office.

MALE, single, ex-service, Catholic. Three years hospitals, one year G.P., requires assistantship with view Sydney. Reply No. 131 c.o. this office.

SIX YEARS GRADUATE, experienced general practice except surgery, wishes locum tenens positions, Adelaide. Single. Own car. Reply No. 133 c.o. this office.

PART-TIME Assistant available two evenings per week and alternate week-ends. Preferably in Sutherland or St. George areas, Sydney. Phone 523-3494.

POSITIONS VACANT

REPATRIATION DEPARTMENT, VICTORIA.
BRANCH OFFICE.

SPECIALIST (OPHTHALMOLOGY).

Applications are invited from registered medical practitioners for appointment as Specialist (Ophthalmology).

Location: Melbourne.

Salary: £2655-£3370.

Duties: Responsible for advice in regard to the medical administration of his speciality, diagnosis, treatment and assessment of cases as required.

Qualifications: Registered medical practitioner with appropriate post-graduate degree or diploma in the speciality.

Applications (by July 8, 1960) to The Deputy Commissioner, Repatriation Department, Box 87A, G.P.O., Melbourne.

DOCTOR in solo practice in northern suburb requires locum for some week-ends and for annual holidays. Will offer attractive brick home, 2 bedrooms, wall to wall carpets, venetians, H.W.S., etc., rented value approximately £600 p.a. rent free in exchange for above services on about 16 week-ends and 4 weeks holiday per annum at times to be mutually arranged. Additional work on a fee for service basis available if desired. Suitable for retiring doctor or married woman doctor. Write No. 138 c.o. this office.

FELLOWSHIP: POST-GRADUATE TRAINING FELLOWSHIP IN PSYCHIATRY, THE UNIVERSITY OF SYDNEY, N.S.W.

Applications are invited from medical graduates for a Post-Graduate Training Fellowship in Psychiatry awarded by the University of Sydney. The Fellowship will be tenable for one year in the first instance but may be renewed for a second and third year.

Applicants must be eligible for admission to candidature for the Diploma in Psychological Medicine in the University of Sydney. Preference will be shown to applicants holding a higher degree or diploma and those applicants with good academic records who have spent not less than six months in the full-time practice of psychiatry either at a mental hospital, a child guidance clinic or the psychiatric unit of an approved general hospital. Medical officers employed by the N.S.W. Public Service may apply.

During the tenure of the Fellowship, Fellows will be supervised by the Professor of Psychiatry and will gain experience at Broughton Hall Psychiatric Clinic, a metropolitan mental hospital, a child guidance clinic and in certain other psychiatric units. Certain Fellows will be seconded for a period of nine to twelve months to act as Registrar in the Psychiatric Department in the Royal Prince Alfred Hospital.

Fellows will be required to proceed to the Diploma in Psychological Medicine in the University of Sydney and will be given full opportunity to attend courses and to satisfy the By-laws and Regulations for the Diploma.

During the tenure of the Fellowship, the stipend will be paid by the N.S.W. Department of Public Health (or by the Royal Prince Alfred Hospital in the case of Fellows seconded) and will be at the current rates prescribed for medical officers of the Division of Mental Hygiene of the N.S.W. Department of Public Health. The following are the rates at present prescribed, subject to cost of living adjustments:

Graduates with less than 4 years post-graduate experience £1856.

Graduates with 2 years and less than 4 years post-graduate experience: £2086.

Graduates with 4 years and less than 5 years post-graduate experience: £2186.

Graduates with 5 years and less than 6 years post-graduate experience: £2286.

Graduates with 6 years and less than 7 years post-graduate experience: £2406.

Graduates with 7 years or more post-graduate experience £2526.

Successful applicant will be expected to take up appointment as soon as possible.

Applications should be lodged by Friday, 8th July, 1960, with the Post-Graduate Committee in Medicine in the University of Sydney, 131 Macquarie Street, Sydney, from whom application forms and further particulars may be obtained.

PART-TIME Assistant required all day Wednesday, in partnership practice, from July 1960. 10 guineas plus petrol. Ring LM 2123 (Sydney).

SERVICE FOR DOCTORS
MEDICAL AGENCY

As Medical Agents our services are well and favourably known by members of the medical profession throughout Australia. New Zealand and overseas.

If you wish to effect a transfer of your practice, engage an assistant or locum tenens, form a partnership or require a valuation, your interests would be best served by either writing, telephoning or calling on Mr. C. S. Pearce, Manager, Medical Agency Section,

WATSON VICTOR LIMITED
201 Victoria Parade, Collingwood, Victoria.
Telephone: JA 4116 —:— Telegrams: WatVic.
Also at Sydney, Brisbane, Adelaide, Hobart, Launceston, Newcastle.

POSITIONS VACANT—Contd.

ASSISTANT with view early partnership required in expanding practice, Northern coastal suburb, Sydney. Ideal working conditions. Salary £50 p.w. plus expenses. Write No. 130 c.o. this office.

LOCUM required to relieve one partner in two-man practice, George District, Sydney, from July 29 to August 13, 1960. £50 p.w. plus car and petrol allowance. Write No. 120 c.o. this office.

WESTERN SUBURBS (Sydney) practice, opportunity for assistant. Salary £50 p.w. Reply No. 112 this office.

ASSISTANT required for Sydney Western Suburbs practice, ex-St. George resident preferred. Salary £50 p.w. Reply No. 115 c.o. this office.

WOMAN DOCTOR wanted for mainly female and pædiatric practice, 10 minutes from Sydney city. Salary 45 guineas a week. Reply No. 113 c.o. this office.

PARTNERSHIP of two in country practice (N.S.W.) requires assistant, view partnership. Salary £50 per week, plus car allowance. Reply No. 100, c.o. this office.

LOCUM wanted for one week commencing 8 a.m., Monday, July 11. Live in, own car. £50 and £5 car allowance, petrol and oil supplied. YW 2424, Sydney.

THE PUBLIC SERVICE OF

PAPUA AND NEW GUINEA

MEDICAL OFFICERS

£2,515–£3,230 p.a. (single). £2,665–£3,380 p.a. (married).

(Actual rates — commencing salary according to qualifications and experience.)

Qualifications: British or Australian registration. Appointees may be required later to undertake course for Diploma of Tropical Medicine and Hygiene or Diploma of Public Health if not already possessed.

Duties: General medical duties, including conduct of hospitals and prevention of disease.

Appointment: Permanent (for British subjects under 45 years) or fixed term engagement.

Leave: Three months after each 21 months in Territory; additional three months' leave after each 6 years and 6 months' furlough after 20 years.

Child Allowance: For first dependent child under 16 years, £52 p.a.; for subsequent dependent children under 16 years, £65 p.a. All officers receiving adult male rates of salary are required to contribute £26 p.a. towards cost of allowance.

Further Information: An information handbook on the Public Service of the Territory is available from Department of Territories, Canberra or Sydney, or from any Commonwealth Public Service Inspector, Commonwealth Employment Office or official country Post Office. Other enquiries to Department of Territories, Canberra ('phone 70411, extension 29A).

Applications: Submit on prescribed form, available from above offices, to The Secretary, Department of Territories, Canberra, A.C.T.

TASMANIA.
GOVERNMENT MEDICAL SERVICE.

There are two vacancies to be filled as District Medical Officers in the District Medical Service. One appointment can be made immediately and one on the 14th July, 1960.

Applications from District Medical Officers for transfers between District Medical Officer posts as vacancies arise are considered.

Salary: At the rate of £2334 with 4 annual increments of £60 to £2574 plus private fees for out-of-hours consultations, dispensing fees where applicable, Repatriation Department examinations and Workers' Compensation fees.

Accommodation: Residence provided with heavy furniture and equipment such as a refrigerator, electric stove, floor coverings, etc. District Medical Officers provide their own light furniture, crockery and cutlery, etc. A rent of £4 4s. a week is deducted from the salary.

Mileage Allowance: District Medical Officers are expected to provide their own car and 1s. per mile is paid for using the car officially for the first 5,000 miles, and 9d. per mile thereafter in any one calendar year.

Leave: Four weeks' annual leave—sick leave—long service leave. Superannuation is payable.

Refund of Travelling Fares to Tasmania: Air fares of the District Medical Officer from any capital city in Australia are refunded immediately. Air fares of dependants and a reasonable amount of the cost of freighting household effects by sea will be refunded over 3 years in amounts of a third of the total amount at the end of each year's service.

Applications stating age and experience with copies of recent testimonials should be forwarded by Monday, 27th June, 1960, to

The Director-General of Health Services,
Department of Health Services.
Davey Street,
HOBART.

REPATRIATION DEPARTMENT VICTORIA.

SPECIALIST—ANÆSTHESIA.

Applications are invited from registered medical practitioners for engagement as Specialist—Anæsthesia at Repatriation General Hospital, Heidelberg.

Salary: £2655-£3370.

Location: Heidelberg.

Duties: Administer anæsthetics; technical advice on anæsthetics, including equipment. Other appropriate duties as required.

Qualifications: A post-graduate degree or diploma in the speciality of Anæsthetics.

Applications, stating experience, qualifications and nominating referees, should be forwarded to Deputy Commissioner, Repatriation Department, Box 37A, G.P.O., Melbourne.

ASSISTANT with view partnership, S.W. Slopes (N.S.W.). Partnership would be unopposed (previously two opposed practices). Sound grazing district. Excellent hospital facilities for family doctor practice. G.C.T. adequate for two and improving. Salary £45, £5 car allowance, house rent free. Reply No. 103. c.o. this office.

ASSISTANT, view partnership with surgeon with higher degree in general practice. Upper North Shore Sydney. Lovely modern furnished home, rent free, 3 bedrooms. Close proximity to transport and schools. To commence duties about 12th August. Salary £2080 p.a. Car allowance £254 p.a. plus oil and petrol. Details of marital status, experience and references helpful. Details in strictest confidence. Reply No. 142 c.o. this office.

REPATRIATION DEPARTMENT, VICTORIA.

MEDICAL OFFICER GRADE 1.
(A number of positions.)

Applications are invited from registered medical practitioners for permanent appointment as Medical Officer, Grade 1.

Location: Melbourne.

Salary: £2200-£2850.

Duties: Medical examinations and reports; other medical administrative duties as required or treatments and diagnosis and reports at Repatriation Institutions.

Qualifications: Registered medical practitioner.

Applications (by July 8, 1960) to The Deputy Commissioner, Repatriation Department, Box 37A, G.P.O., Melbourne.

DEPARTMENT OF HEALTH, NEW SOUTH WALES.

SCHOOL OF PUBLIC HEALTH AND TROPICAL MEDICINE.

SENIOR MEDICAL OFFICER GRADE I, £2850-£3240.

Unit of Industrial Hygiene and Medicine.

Duties: Participate in the teaching activities of the Unit; undertake research into occupational health problems; make investigations with respect to occupational health risks in Commonwealth Departments and other establishments.

Qualifications: Legally qualified medical practitioner with experience in industrial medicine.

Applications to The Director, School of Public Health and Tropical Medicine, University Grounds, Sydney, N.S.W., by 11/7/60.

When prescribing tetracycline specify New Palatable

Tetracyn* ORAL SUSPENSION

Pfizer

* TRADE MARK
CHAS. PFIZER & CO.

POSITIONS VACANT—Contd.

PUBLIC SERVICE OF VICTORIA.

Vacancy for
MEDICAL OFFICER (MALE OR FEMALE),
TUBERCULOSIS BRANCH,
DEPARTMENT OF HEALTH.

Applications, addressed to the Secretary to the Public Service Board, Public Offices, Treasury Place, Melbourne, C.2, and accompanied by evidence of qualifications and experience and a statement of date and place of birth are invited for the abovementioned position up to Wednesday, the 20th July, 1960.

Yearly salary:
Male: £2411 minimum; £3091 maximum.
Female: £2231 minimum; £2911 maximum.

(Commencing salary according to experience.)
Qualifications: To be a legally qualified medical practitioner of Victoria, with at least one year's post-graduate experience.

ASSISTANT with view to partnership required by expanding group practice. This practice is conducted from a modern, fully-equipped and separate clinic with X-ray and Pathology facilities. Salary £60 per week and cottage. 1107 Princes Highway, Engadine, N.S.W. Phone Engadine 213.

ASSISTANT wanted in central Western Suburb, Sydney. Married. With or without view early partnership. Salary £2500 plus car allowance. Modern surgery unit. Nights and week-ends on roster. Write No. 140 c.o. this office.

ASSISTANT wanted for Sydney appointment practice. A married man preferred with at least 2 years hospital and G.P. experience and interest in medicine or allied specialty. Basic salary £35 per week plus bonus and comfortable residence. State particulars to No. 123 c.o. this office.

HOSPITAL APPOINTMENTS

TULLY HOSPITAL.

Locum required for Medical Superintendent, Tully Hospital, for 5 weeks from 8th August or 10th October. Full-time position. Daily average 25 in-patients, 20 out-patients. Salary £45 per week. Accommodation provided. Return fares and travelling expenses within Queensland paid. Apply Secretary, Tully Hospitals Board, Tully, North Queensland.

ST. VINCENT'S HOSPITAL, SYDNEY.

RADIOLOGICAL REGISTRAR.

Applications, addressed to the Superior General at the Hospital, are invited for the above position. Applicants must be graduates of at least three years' standing and preference will be given to those who are attending the Diploma Course. Appointment is for twelve months and the successful applicant will be eligible for re-appointment. Further particulars may be obtained from the Medical Superintendent.

Salary range at the rate of £1708 to £1958 per annum and live out.

Applications close 8th July, 1960.

THE LANGTON CLINIC—MOORE PARK, SYDNEY, N.S.W.

HONORARY MEDICAL OFFICERS.

The Langton Clinic, a public hospital recently established for the treatment of alcoholism, invites applications for the positions of Honorary Medical Officers, to conduct Out-patient Clinics.

Application forms and further information may be obtained, on request, from the undersigned. (Phone 31-2196.)

A. P. DIEHM,
Chief Executive Officer
and Secretary.

AYR HOSPITALS BOARD.
AYR HOSPITAL, N.Q.

RESIDENT MEDICAL OFFICER.

Applications are invited for the above position. Duties to include the administration of anæsthetics at the Home Hill Hospital.

Salary classification: 1st year £1290-£1350, 2nd year £1445-£1525, 3rd year £1610-£1700, plus basic wage adjustment (at present £55) and northern allowance £30.

One month's notice on either side to terminate engagement. Immediate appointment.

A new residence has been constructed which cost £5000. Partly furnished—septic, hot water, electric hot wash boiler, electric stove, built-in cupboards.

Applications stating age, experience, marital status, war service (if any) and date when can commence duties, together with copies of references to be lodged with the Secretary, Ayr Hospitals Board, Ayr, N. Qld.

C. J. JACOBSON,
Secretary.

THE ROYAL NORTH SHORE HOSPITAL OF SYDNEY.

BRITISH AUSTRALASIAN TOBACCO COMPANY FELLOW IN CANCER RESEARCH.

The above vacancy exists in the Unit of Clinical Investigation. The duties of the successful applicant would be to study factors related to the growth and metastasis of cancer cells. He could begin with interesting work already established in the Unit and develop his own lines of research. Appointment would be for one year but would be renewable for 3 years or more depending on the progress of the work.

Applicants should be either medical or science graduates, preferably with some training in biological laboratory work.

Salary up to £3250 p.a., depending on qualifications and experience.

Closing date, 13th July.

Letters of application and enquiries should be addressed to The General Medical Superintendent, The Royal North Shore Hospital of Sydney, Crows Nest, N.S.W.,

THE ROYAL WOMEN'S HOSPITAL, MELBOURNE.

PATHOLOGY DEPARTMENT.

Applications closing on the 31st July, 1960 are invited from Medical Graduates for the position of

ASSISTANT PATHOLOGIST.

Applicants should have experience in pathology, especially morbid anatomy. Duties will include taking part in the carrying out of the current activities of the Department, especially in morbid anatomy, instruction of students and conducting of research. The appointment could be made at 2 levels either as a specialist (salary range £2,900-£3,600) or assistant specialist (£2,300-£2,800). Allocation to either grade and starting salary within the grade will depend on qualification and previous experience.

Contributory superannuation.

Further details can be obtained from The Director of Pathology, The Royal Women's Hospital, 720 Swanston Street, Carlton, N.3, Victoria, Australia.

ROYAL ALEXANDRA HOSPITAL FOR CHILDREN, CAMPERDOWN, SYDNEY.

X-RAY REGISTRAR.

Applications are invited for the position of Registrar in the X-Ray Department, duties to commence as soon as possible. Salary in the range £1483-£1958 according to experience. Applications, with copies of references, to Acting Chief Executive Officer & Medical Superintendent by 4th July, 1960.

THE VICTORIAN EYE AN
EAR HOSPITAL, EAST ME
BOURNE.

ANÆSTHETISTS—SESSIONAL

The Victorian Eye and Ear Ho
pital invites applications for t
position of Anæsthetist to the Ho
pital on a sessional basis (mo
than one vacancy available).

Salary and conditions in accor
ance with the scale laid down b
the Hospitals and Charities Com
mission.

Application forms may be o
tained from the undersigned an
close on 15/7/60.

Further information may b
obtained from the Medical Supe
intendent, Dr. K. G. Howsam.

C. G. BAIRD,
Manager.

THE BROKEN HILL AN
DISTRICT HOSPITAL,
P.O. BOX 457,
BROKEN HILL, N.S.W.

Applications are invited fro
2nd year Resident Medical Office
(male or female) for the positi
of Resident Medical Officer
Broken Hill and District Hospita
Salary: £1600 per annum, le
£3.11.3 per week for board an
lodgings. In the case of marri
applicants, a furnished residen
is available at a nominal rent
Thirty days' annual leave; rail
air fares refunded after 6 mont
service.

Duties: Rotating residenci
every three months in medici
surgery, casualty, obstetrics a
anæsthetics.

Daily average in-patients 26
Applications addressed to t
undersigned, should state full pa
ticulars of qualifications and e
perience, and enclose copies o
of any credentials.

R. H. NANKIVELL,
Secretary/Business Manag

THE VICTORIAN EYE AN
EAR HOSPITAL, EAST ME
BOURNE.

HOUSE SURGEON.

Applications closing on the 1
July, 1960, are invited for
position of House Surgeon in
Eye Department to commence
7th December, 1960. Commenc
salary at rate of £1500 per ann
Applicants should have t
years' general clinical experie
Previous training in Ophthal
logy is not essential but prefer
will be given to persons who h
obtained the Part I F.R.A.C.S
Part I D.O. The term of appo
ment is for two years.

Further particulars and appl
tion forms are available from
Medical Superintendent, Dr. K
Howsam.

C. G. BAIRD,
Manag

BRITISH MEDICAL AGENCY
OF N.S.W. LIMITED
B.M.A. HOUSE, 135-137 MACQUARIE ST., SYDNEY

SERVICES FOR THE MEDICAL PROFESSION

MAGAZINE SUBSCRIPTIONS — All Australian and Overseas Titles Obtainable

ASSISTANTSHIPS — LOCUMS — VALUATIONS

SALES OF PRACTICES AND PARTNERSHIPS

GENERAL INSURANCES — Including Fire, Workers' Compensation, Motor Vehicle, etc.

PRINTING AND STATIONERY

APA ALL SICKNESS AND ACCIDENT POLICIES PROTECT INCOME

THE AUSTRALIAN PROVINCIAL ASSURANCE ASSOCIATION LTD.

APA LIFE OR ENDOWMENT POLICIES PROTECT DEPENDANTS

CHIEF AGENTS — CHIEF AGENTS

Increased taxation deductions to £400 can now be claimed for premiums paid.

Combined Benefit Policies for all Sickness and Accident, and Life or Endowment are of particular interest to the medical profession.

Schedules promptly forwarded on request.

Telegraphic address: Locumtens, Sydney.
Telephones: BU 3340, BU 3349; after hours, FM 6238.

P. R. E. MURNIN, Manager.

BRITISH MEDICAL AGENCY OF N.S.W. LIMITED

SPITAL APPTS.—Continued

OOWOOMBA HOSPITALS BOARD.

RESIDENT MEDICAL OFFICERS, TOOWOOMBA HOSPITAL.

pplications are invited to fill vacancies as Resident Medical ers which exist at the Tooomba Hospital.

alary classification at present: imum £1410, maximum £1960.

taff quarters available for le officers only. Officer living receives an allowance of £100

onsultants visit the hospital on egular sessional basis. Daily rage: in-patients 240, outnts 130.

pplicants to give full particuof past experience, marital e, age, and attach certified es of testimonials held.

rmination of service — one th's notice either side.

pplications to be addressed to Secretary, Hospitals Board, woomba, Queensland.

J. SEAWRIGHT, Secretary.

PALMERSTON NORTH HOSPITAL BOARD. PALMERSTON NORTH, NEW ZEALAND.

RADIOLOGIST.

Applications are invited from registered Medical Practitioners for the position of whole-time Radiologist in charge of the Diagnostic X-ray Department at the Palmerston North Hospital, New Zealand.

Applicants must have had practical experience in Diagnostic Radiology and should hold a higher qualification in this specialty in order to qualify either as a Senior or as a Junior Specialist under the Hospital Employment (Medical Officers) Regulations, 1957.

Salary (in N.Z. currency):
Senior Specialist, Scale (*b*) £2400-£2650 p.a. or Scale (*c*) £2100-£2400 p.a.
Junior Specialist £1700-£2000 p.a.

Conditions of appointment may be obtained on application to the undersigned.

Applications giving full particulars as to age, qualifications and experience accompanied by recent testimonials and advice as to the earliest date on which appointment could be taken up, to be addressed to the Secretary, Palmerston North Hospital Board, P.O. Box 607, Palmerston North, New Zealand.

R. S. WILSON, Secretary.

PRESTON AND NORTHCOTE COMMUNITY HOSPITAL, BELL STREET, PRESTON N.18, VICTORIA.

HONORARY MEDICAL STAFF.

The Board of Management invites applications from suitably qualified medical practitioners for appointment as:
Honorary Physician (1 position)
Honorary Surgeon (1 position).

The appointments will be for a period ending 30th June, 1965.

Details regarding the appointments may be obtained from the Medical Superintendent.

Prescribed application forms are obtainable from and should be lodged with the undersigned by 7th July, 1960.

R. H. KRONBERG, Manager.

RACHEL FORSTER HOSPITAL FOR WOMEN AND CHILDREN, REDFERN, N.S.W.

SENIOR RESIDENT MEDICAL OFFICER (FEMALE).

Applications are invited for the above vacancy. Salary in accordance with the Hospitals Commission determination. Applications to be addressed to the General Superintendent.

MARY C. PUCKEY, General Superintendent.

SOUTH BRISBANE HOSPITALS BOARD.

Applications are invited for the position of full-time Radiologist (Specialist Registration, i.e., with diploma and three (3) years' experience in Radiology) at the Princess Alexandra Hospital, South Brisbane.

Salary will be at the rate of £2760 per annum subject to future basic wage adjustments, plus superannuation.

Applications closing on 15th July, 1960, should be addressed to the Acting Manager, South Brisbane Hospitals Board, Ipswich Road, Woolloongabba, Brisbane.

THE EASTERN SUBURBS HOSPITAL, QUEENS PARK ROAD, BONDI JUNCTION, SYDNEY.

SENIOR AND JUNIOR RESIDENT MEDICAL OFFICERS

required. Hospital has capacity of 100 beds and a large Out-patients' Department. Also has full visiting Honorary Medical Staff.

Salary in accordance with Hospitals' Commission Determination.

Applications containing age, qualifications and experience should be addressed to the undersigned or phone FW 1185.

J. D. COHEN, Secretary.

MEDICAL AGENTS

PRACTICES FOR TRANSFER
LOCUMS, ASSISTANTS, ETC.

1. N.S.W. Central Western. Solo unopposed. G.C.T. over £7000. Goodwill £2500. Exceptional terms. 10-bed hospital. Furnished cottage, 3 bedrooms, leased at £10 p.w.

2. Sydney. Western Suburbs partnership practice. Gross cash over £12,000. Half share £3000. Complete surgery suite leased at 5 gns. p.w. No residence.

All Enquiries Confidential

GOYDER, SON & CO.

11c Castlereagh Street, Sydney

Telephones: BW 7149, BW 7828

After Hours: JJ 3665

Cables and Telegrams:
"MEDANREAL, Sydney"

The name of Goyder has been associated with Medical Agency since 1902.

HOSPITAL APPTS.—Continued

RACHEL FORSTER HOSPITAL FOR WOMEN AND CHILDREN, REDFERN, N.S.W.

Applications are invited for the position of

RESIDENT MEDICAL OFFICER (Female).

Salary range, £1019 to £1953, less £3.13.11 p.w. B. & R. General Superintendent, MX 2591.

THE VICTORIAN EYE AND EAR HOSPITAL, EAST MELBOURNE.

ANÆSTHETIST—FULL-TIME OR PART-TIME.

The Victorian Eye and Ear Hospital invites applications for the position of Anæsthetist to the above hospital.

Appointment on a full-time basis is preferred, but appointment on a part-time basis of not less than 6/10 full-time would be considered. Salary and conditions in accordance with the scale laid down by the Hospitals and Charities Commission.

Application forms may be obtained from the undersigned and close on 15/7/60.

Further information may be obtained from the Medical Superintendent, Dr. K. G. Howsam.

C. G. BAIRD,
Manager.

SERVICE for DOCTORS

MEDICAL AGENCY

PRACTICES — **LOCUMS**
INVENTORIES — **ASSISTANTS**
VALUATIONS — **PARTNERSHIPS**
CONFIDENTIAL SERVICE — **MANAGER, R. E. AKERS**

No. 556. Large Town in Riverina.
Golden opportunity for Doctor with family. Assistantship 3 to 6 months then 40% partnership for 6 months with half-yearly increments of 2½% up to equal half share. Free use of partly furnished 4 bedroom brick house during assistantship. Salary 50 guineas p.w. Car 5 guineas p.w. Good hospital facilities. A.G.C.T. £12,000—40% share £2280. Terms by arrangement.

No. 544. Sydney—Outer Western Suburbs.
Assistant with view to half share partnership. Period 2-4 weeks. Salary 45 guineas, 5 guineas car allowance, 5 guineas living out allowance. Half share of goodwill £2000. Half share of equipment of 2 surgeries £300 approximately. Present G.C.T. £7500. Principal considers G.C.T. could be doubled with an assistant. Applicants must be able to perform obstets. Married or single, male or female.

No. 545. Wollongong Area.
Assistant with view one-third share partnership at end of 6 months. Salary £50 p.w. Car allowance £5 p.w. Rent-free furnished flat of 2 bedrooms during assistantship. Doctor interested in surgery or anæsthetics preferred, but not essential.

No. 548. South Coast.
Assistant with view to one-third share partnership. Period of assistantship six months. Rent-free furnished flat during assistantship. Protestant. Leaning to Obstets. Salary £50 p.w. Car allowance £5 p.w. Principal willing to employ prospective assistant as a locum for three weeks before an assistantship agreement is concluded.

WATSON VICTOR LIMITED

9 Bligh Street, Sydney.
BW 4433.
After Hours: 58-0202.

Telegrams: WatVic. Cables: Raysex.

Also at Brisbane, Melbourne, Perth, Adelaide, Newcastle, Hobart, Launceston.

THE WOMEN'S HOSPITAL (CROWN STREET), SYDNEY.

RESIDENT PÆDIATRIC REGISTRAR.

Applications closing 11th July, 1960, by letter addressed to the undersigned, giving necessary personal and professional details, are invited for the position of

REGISTRAR IN PÆDIATRICS.

for six months commencing as soon as possible (with eligibility for reappointment for similar term/s).

The successful applicant will be a graduate of at least three years' standing and the salary and conditions will be in accordance with the Hospitals Commission Determination for Registrars (trainee specialists). Salary scale £1708 to £1958.

R. B. GOLSBY,
Secretary and Chief Executive Officer.

GEELONG & DISTRICT HOSPITAL (KITCHENER MEMORIAL).

ASSISTANT MEDICAL SUPERINTENDENT.

Applications are invited from legally qualified Medical Practitioners for the position of Assistant Medical Superintendent to the above hospital.

Duties will be mainly medical as admitting officer with some administration and supervision of resident medical staff.

The salary range will be £2200 to £3000 per annum according to qualifications. The position is non-resident.

Further details of the duties and medical statistics of the hospital are obtainable from the Medical Superintendent with whom applications close on 1st July, 1960.

E. J. R. TAYLOR,
Manager and Secretary.

ATHERTON HOSPITA

RESIDENT MEDICAL OFFICE

Applications are invited for t position of Junior Resid Medical Officer at the Ather Hospital, North Queensland.

Salary classifications at pres including all basic wage adj ments: first year, £1405; sec year, £1580; third year, £17 fourth year, £1955; to which added £50 northern allowance. furnished brick residence w modern conveniences is availa with free light and power. Fr board and lodging provided for single person. Atherton is situat on the Atherton Tableland, 2 feet above sea level and is co nected to all main centres by r and bitumen road. Hospital da average—80 in-patients, 60 o patients.

Apply, Secretary, Atherton H pitals Board.

BANKSTOWN DISTRICT HO PITAL, PATHOLOGY DEPARTMENT.

RESIDENT MEDICAL OFFICE

Applications are invited for t above vacancy in the Hospita Pathology Department, which pr vides a full service in all branch of pathology to a modern 300-b hospital. The department has staff establishment of 14 and controlled by a full-time patho gist, from whom further inform tion can be obtained. Salary accordance with Hospitals Co mission determination.

Applications should be addres to The Secretary, Bankstown D trict Hospital, Bankstown, N.S.

CHARLEVILLE HOSPITA BOARD, CHARLEVILL SOUTH-WEST QUEENSLAND

Applications are hereby inv from registered medical pra tioners for the position of Me Superintendent of the Charle Base Hospital.

The position is a full-time A new brick residence available hospital grounds. Free re electricity, fuel, light, power, frigerator, electric stove provi Commencing salary £2650 annum plus adjustments. superannuation scheme is av able.

Charleville Hospital has a a average of 50 general in-pati 7 maternity in-patients and 20 patients.

Applicants to state marital st age and experience.

Applications to be in writing addressed to the Secretary, Ch ville Hospitals Board, Box Charleville. Applications close 12 noon on Monday, 25th J 1960.

BRITISH MEDICAL INSURANCE CO. OF N.S.W. LTD.

82 ELIZABETH STREET, SYDNEY.

Fire, Accident, All Sickness, Motor Car Insurances at lowest premiums. Life assurances arranged with leading Life Company.

Telephone: BW2691. After hours: General, J. D. Gilbert, FU2308; Life, L. Cutting, JJ4453.

UNDER THE ÆGIS OF THE BRITISH MEDICAL ASSOCIATION.

DICAL PRACTICES

RGICAL INSTRUMENTS,
URGICAL EQUIPMENT,
AMINATION COUCHES,
BRASS PLATES.

anly-Warringah. N.S.W.
-share available in two-man
nership taking over £14,000
pidly growing area. Good-
£3200; surgery instruments,
hings, etc., £800. Rental of
rn, well-equipped surgery
p.w. No house to purchase
incoming partner to live
from practice.

have several city and
ry G.P.'s wishing to employ
tants with a definite view
ater partnership. In every
accommodation can be pro-
and terms allowed to "buy
As the principals concerned
personally known to the
such positions can be
mended to reliable doctors.

CHARD THOMSON
AND CO. PTY. LTD.,
(Founded 1878.)
Castlereagh Street, Sydney.
1561 BM 2562 MA 1440
After Hours:
L. Hanrahan, FF 3343.
Locums • Assistantships
• Probate Valuations
• Partnerships

MISCELLANEOUS

ST-GRADUATE STUDY BY CORRESPONDENCE FOR ALL TISH AND AUSTRALIAN MEDICAL EXAMS.

loma in Anæsthetics; Diploma
ychological Medicine; Diploma
Ophthalmology; Diploma in
ology; Diploma in Laryn-
y; Diploma in Child Health;
C.S.Eng., and all Surgical
inations; M.R.C.P.Lond., and
Medical Examinations; M.D.
of all Universities: Courses
all Qualifying Examinations.
lete Guide to Medical Exam-
ns sent free on application.
icants should state in which
ification they are interested.
ess: Secretary, Medical Cor-
ndence College, 19 Welbeck
, London, W.1.

COLLECTORS

collect overdue accounts
hin the State, throughout
Australia and Overseas.

Please post your list to
JAYS AGENCY
20 Collins St., Melbourne
'phone 63-7048 or 63-7049
and we will call.

ANTI-CANCER COUNCIL OF VICTORIA.

RESEARCH GRANTS.

The Anti-Cancer Council of Victoria will promote and subsidise research into the cause, prevention and treatment of cancer.

Financial support may be given in the form of Grants-in-Aid:

(*a*) (i) To ensure that research is carried out under adequate supervision and with suitable equipment, an application will be received only from the Head of a Department or Institution in Victoria on his own behalf or on behalf of a worker who is already under his supervision or for whom such supervision can be arranged.

(ii) Any individual desiring a grant-in-aid should first arrange with the Head of a University Department or Director of an Institute or other approved Department to sponsor his research by providing the necessary facilities and by making application on his behalf for a grant-in-aid.

(iii) An Institution or Department will be "approved" only in relation to the research project for which a grant is sought.

(*b*) Preference will be given to full-time workers. Part-time research will be considered in the case of an applicant who is otherwise engaged in an approved activity.

(*c*) Applications for financial assistance may include:

Salaries—in accordance with the scale adopted from time to time by recognized research organizations.

Expenses—as required may be allowed up to a financial value not exceeding that of the salary of the senior worker on the project. (It is recognized that the salary of such senior worker need not necessarily form part of the grant.) An account of expenditure under this heading must be rendered at the end of the term and unexpended balance refunded.

Expenses will include:

1. Technical assistance.
2. Animals.
3. Chemicals and glassware.
4. Materials.

(Requests for major items of equipment should be the subject of a separate application.)

(*d*) Grants may be made for more than one year, but shall be subject to review in November in each year.

(*e*) The allocation of monies granted for specific purposes may not be varied during the tenure of the grant, e.g., monies allotted as salaries may not be used for the purchase of equipment or materials.

Applications for grants-in-aid, which close on 15th September, will be considered in November, 1960, for 1961.

CONSULTING SUITE with secretarial service available, Macquarie Street, Sydney, six half-days a week. Ring BU 3422.

SUITE, 2 rooms and waiting room available, William Bland Centre, 231 Macquarie Street, Sydney. With or without secretary, phone, etc. Sessional or other basis. Orthopædic surgeon preferred. Reply No. 128 c.o. this office.

VALUABLE FREEHOLD PROPERTY—IMPOSING BRICK BUILDING.

Approximately 40 squares, Marrickville area. Large lawn area, double garage, most suitable doctor's surgeries and home, medical centre and/or private hospital.

Inspection by appointment.

K. W. KELLY & Co.,
LA 6946.
51 King Street, Newtown,
LA 7653.
Member Real Estate Institute of N.S.W.

X-RAY EQUIPMENT for sale. "Quadral" 300 M.A., four-valve, generator. Shock proof tube and cables. Tube stand. Fluoroscopic tube table. Bucky. All in use. Best offer. BW 3203 (Sydney).

CHATSWOOD. Professional rooms available for specialists only in established medical building. Fully furnished and available on sessional basis. Further particulars available on phoning JA 2773, Sydney.

REPLIES TO BOX NUMBER ADVERTISEMENTS

The names and addresses of advertisers using box numbers are held by us in strict confidence and cannot be disclosed. Applications should be separately enclosed and clearly addressed: Box No. —, "The Medical Journal of Australia", Seamer and Arundel Streets, Glebe, Sydney.

It is not possible for this office to accept telephone messages for relay to advertisers.

TO LET. Professional rooms in Edgecliff Road, Sydney, Part-time. Serviced. Ring BW 5406. (1.30 p.m.-6 p.m.)

AVAILABLE half-share lease of double suite, Macquarie Street. Ring JF 4093 (Sydney).

SURGICAL INSTRUMENTS
MEDICAL BOOKS
HOSPITAL EQUIPMENT
Consult
W. RAMSAY SURGICAL (N.S.W.) PTY. LTD.,
134 Castlereagh Street, Sydney.
'Phone MA 5836, BM 2679.

WILLIAM PEARCE
MEDICAL AGENCY SERVICE

No. 574. Western Suburbs. Sydney. Eight miles from G.P.O. Lock-up partnership practice. Half share available. Gross cash exceeds £12,000, could be improved. Goodwill £3000 payable by monthly instalments over 5 years, free of interest. An excellent opening.

No. 575. Central West. N.S.W. Unopposed general practice. Excellent hospital (35 beds). G.C.T. over £7000. Goodwill £1500. Furniture and equipment £1460.

No. 577. Central Western Slopes. N.S.W. Opposed general practice in very pleasant township, 185 miles from Sydney, offering excellent living conditions, well equipped district hospital. Average G.C.T. £8000. Architect-designed residence has three bedrooms, sleepout, professional rooms, all conveniences. Goodwill £2500. Residence £4500. Terms available.

WILLIAM PEARCE
AND CO. PTY. LTD.,
149 Castlereagh Street, Sydney.
Phone: 61-8821.

SECURITY CAN BE YOURS in the new
"AGRICULTURE HOUSE",
195 Macquarie Street, Sydney.
MEDICAL AND DENTAL SUITES.

Designed to meet the specialized requirements of the professional man, this new building is now scheduled for completion the end of June, 1960.

Agriculture House offers the best services in Macquarie Street:

Messenger Service,
Telephone Service,
Hot and Cold Water,
Compressed Air,
Stretcher Lift,
Inquiry Bureau,
Incineration, etc.

There are a limited number of suites available, ranging from 285 sq. ft. to 890 sq. ft.

LIBERAL TERMS ARE AVAILABLE.

Managing Agent for Brochure:
MARSLAND BARRON PTY. LTD.,
11c Castlereagh Street, Sydney.
BW 9555.

SURFERS PARADISE. Palm Grove luxury S.C. serviced flats. Near beach and town. Modern. Brochures available. 8 Clifford St., phone 9-1705.

M.R.C.P. (London). Take our correspondence course before coming to England. Or use it for the M.R.A.C.P. All our tutors are highly experienced in Membership tuition, and we send the first parts by air mail. Write J. ARNOLD, 189 Regent St., London, W.1, England.

Printed and published by AUSTRALASIAN MEDICAL PUBLISHING COMPANY LIMITED at the registered office of the company, The Printing House, Seamer Street, Glebe, Sydney, New South Wales.

AN
FOR
COCCAL INFECTIONS
ERYTHROCIN
ABBOCILLIN-VK
SPONTIN
a

. 1960

S

XUM